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LANCASHIRE COUNTY COUNCIL

ANNUAL REPORT
of the
COUNTY ANALYST
for
THE YEAR 1960

Printed by

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WITH THE COMPLIMENTS OF THE COUNTY PUBLICITY OFFICER

LANCASHIRE COUNTY COUNCIL

WORK OF THE COUNTY ANALYST'S DEPARTMENT - 1960.

The attached copy of the Annual Report of Dr. George H. Walker, County Analyst, is sent for editorial comment. One or two items are now spotlighted in order to save the time of journalists in reading the whole of the report, although everything in the report can, of course, be the subject of Press comment.

The introductory notes prepared by the County Analyst and addressed to the Committee are interesting - particularly on the top of Page 4, which gives a comparison of Channel Islands milk as against ordinary milk.

On Page 8 there is a reference to "The Skimmed Milk with Non-Milk Fat Regulations 1960" and in this connection it is noted that these Regulations are quite new, coming into operation next week - i.e. 19th September, 1961.

Page 27 (Table 11) deals with adulteration of the various grades of milk. On this it should be pointed out that in the case of the first three items the milk is bulked for sampling, whereas raw milk (Item 5) is taken from individual churns.

Page 70 - "Ice-Cream" provides an interesting tabulation. Table 22 on that page relates to ordinary ice-cream but at the foot of the table is a statement on Dairy Ice-cream. It should be explained that "Dairy Ice-cream" has no fat other than milk fat.

Page 77 to half way down Page 79 is well worth a comment as it deals with a miscellaneous assortment of samples - fish, tomato paste, etc., and on Pages 80 - 86 under the heading "Samples containing extraneous matter" there are a number of revealing facts.

Observe also from the foot of Page 88 to the end of the third paragraph on Page 90 a report on Milk (Special Designation) Regulations.

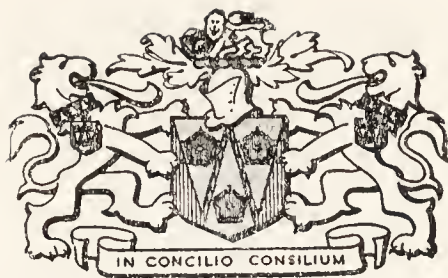
On pages 104 - 113 is a report on the topical subject of "Radioactivity" which should be worthy of comment.

Page 117 might be of interest with two items showing analysis of toothpaste and lipstick.

STEPHEN DUNCAN

County Hall,
PRESTON.

13th September, 1961.




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PUBLIC HEALTH AND HOUSING COMMITTEE

(1961)

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COUNTY ALDERMAN SIR ALFRED BATES, M.C., D.L.

The Vice-Chairman of the County Council :

COUNTY ALDERMAN SIR ANDREW SMITH, C.B.E., J.P.

The Chairman of the Finance Committee :

COUNTY ALDERMAN H. LUMBY, C.B.E., J.P.

The Chairman of the Health Committee :

COUNTY ALDERMAN HARRY LORD, M.B.E., J.P.

Chairman of Committee :

COUNTY COUNCILLOR F. L. NEEP

Vice-Chairman :

COUNTY ALDERMAN J. W. THORLEY

County Aldermen :

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SIR THOMAS TOMLINSON, J.P.

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P. WORTH, Esq.

W. WROE, Esq.

LANCASHIRE COUNTY LABORATORY

STAFF 1961

County Analyst :

G. H. WALKER, PH.D., B.Sc., F.R.I.C.

Deputy County Analyst :

A. C. BUSHNELL, F.R.I.C.

Senior Assistant Analyst :

J. COTTAM, B.Sc., F.R.I.C.

Second Senior Assistant Analyst :

M. S. GREEN, B.Sc., A.R.I.C.

Assistant Analysts :

J. L. WILLIAMS

G. W. EARNshaw, GRAD. R.I.C.

K. FISHER, GRAD. R.I.C.

R. E. BRIDGE, M.Sc.

MRS. D. FORBES, B.Sc., A.R.I.C.

R. STUBBS, B.Sc.

A. HOLLIS, B.Sc.

T. HODSON

C. E. FENN

Laboratory Assistants :

MRS. B. SCOTT

MISS M. HARRISON

MISS C. M. WARE

Clerical Staff :

E. L. SIMPSON, T.D., F.C.C.S.

H. HIGGINSON, A.C.C.S.

MISS O. THOMAS

MISS S. HARPLEY

Laboratory Attendant :

MRS. M. CLITHEROE

LANCASHIRE COUNTY COUNCIL

ANNUAL REPORT OF THE COUNTY ANALYST FOR THE YEAR 1960.

To the Chairman and Members of the Lancashire County Council.

I have the honour to submit for your consideration my fifteenth Annual Report which deals with the work carried out in the County Laboratory during the year ended 31st December, 1960. The total number of analyses and tests carried out in this period was 13,458, in order to facilitate reference these have been grouped under the following headings :—

- Part I. Reports on samples taken under the Food and Drugs Act, 1955. Page 7.
- Part II. Report on Heat-treated Milk Samples taken under the Milk (Special Designation) (Pasteurised and Sterilised Milk) Regulations, 1949 to 1953. Page 88.
- Part III. Report on samples taken under the Fertilisers and Feeding Stuffs Act, 1926. Page 94.
- Part IV. Report on Waters, Effluents, etc. Page 99.
- Part V. Radioactivity. Page 104.
- Part VI. Miscellaneous (including Atmospheric Pollution). Page 113.

The total number of samples from all sources examined during the year is the second highest recorded for the laboratory. The number of samples examined for the County under the Food and Drugs Act and the Fertilisers and Feeding Stuffs Act (excluding, however, milk samples submitted for Phosphatase, Methylene Blue or Turbidity Tests) was 7,914. The number of Food and Drug samples submitted by the 12 Autonomous Food and Drugs Authorities, for which your Analyst acts as Public Analyst, was 2,366.

The number of Food and Drugs samples (excluding appeal-to-cow samples) submitted by the County Sampling Officers during the year 1960 was 7,857 as against 8,256 during the previous year and 8,225 in the year 1958 ; the rate of samples per 1,000 of the population was 5·48 in the year under review, 5·76 in 1959 and 5·81 in 1958.

The number of County Food and Drugs samples has, therefore, been maintained well above the level reached in 1947 (6,819). Prior to 1947, the highest figure was 5,263 in the year 1933. During the year the number of samples found to be adulterated or unsatisfactory was 361 ; this corresponds to an adulteration rate of 4·6 per cent., as against 4·5 per cent. in the year 1959, and 4·9 per cent. in the year 1958. Table 4 gives the percentage adulteration for the last 10 years and it will be seen that there has been an appreciable drop over that period compared with the years 1941 to 1948 when the adulteration rate varied from 9·3 to 5·7 per cent. Viewed in the light of the figures for the last 10 years and for the period immediately preceding, the adulteration rate for the year, 1960, cannot be regarded as altogether unsatisfactory although it is higher than in the years immediately preceding the war when the percentage adulteration varied from 2·6 to 4·2.

In addition to Food and Drugs samples the County Sampling Officers submitted 1,244 samples of heat-treated milk for examination by the Phosphatase test, the Half-hour Methylene Blue test or by the Turbidity test as against 1,202 samples submitted in the previous year. Of these, five failed to pass the Phosphatase test and one sample failed to pass the statutory Methylene Blue test ; the corresponding figures for the year 1959, being 12 and nil. The number of Specified Areas in the County in which only designated milks can be sold is continually increasing due to the making of Milk (Special Designations) (Specified Areas) Orders and by the 6th April, 1959, a total of 90 of the 93 County Districts in the County Food and Drugs Area had become Specified Areas*. As a result of this policy on the part of the Government, more and more milk sold under special designations is being consumed and in view of the fact that it is the duty of the Food and Drugs Authority to enforce the provisions of Section 37 of the Food and Drugs Act, 1955, it follows that an increased number of samples is now being taken by County Sampling Officers for submission to the County Laboratory for examination by the statutory Phosphatase, Half-hour Methylene Blue or Turbidity tests.

As usual approximately two-thirds of the Food and Drugs samples submitted by the County Sampling Officers consisted of samples of milk. Of 5,051 milk samples, 178 were found to be adulterated which

* The Three remaining County Districts became Specified Areas on the 10th April, 1961, as the result of the making of the Milk (Special Designations) (Specified Areas) Order, 1961.

represents an adulteration rate of 3·5 per cent. The corresponding figure for the year 1959 was 3·7 per cent. and for the year 1958 it was 4·3 per cent. Milk adulteration in the County of Lancaster has, in general, shown consistent and appreciable decreases since the year 1946. It is reasonable to assume that these decreases are in some measure due to the increased sampling which has occurred since that year.

The adulteration rate for samples other than milk was 6·5 per cent. and is 0·6 per cent. higher than that obtained in the year 1959 when the figure was 5·9 per cent. The adulteration rate for the last 10 years has varied from 3·8 to 6·5 per cent., the former figure in the years 1952 and 1953 and the latter in the year 1960. The commodities which showed a relatively high proportion of unsatisfactory samples and, therefore, contributed especially to the adulteration rate included sausages, samples containing extraneous matter and samples whose labels did not conform to the requirements of the Labelling of Food Order. An examination, however, of table 21 and the sections of the report concerned with the commodities just mentioned will bring to light the fact that many of the samples reported as unsatisfactory showed only slight irregularities in composition or minor infringements of labelling requirements.

Four new Statutory Regulations which affect the work of the Public Analyst were made in the year under review. The Milk (Special Designation) Regulations, 1960, are discussed in Part II of this report and they introduce new or modified tests for keeping quality and efficiency of heat treatment. The Skimmed Milk with Non-Milk Fat Regulations, 1960, are mentioned at the beginning of Part I of this report and they control the labelling and advertising of specified foods containing the named ingredients; the Regulations will not, however, apply to sales by a caterer for immediate consumption on his premises. The Meat (Staining and Sterilization) Regulations, 1960, prescribe that certain coal tar colours shall be used for the staining of knacker meat. The last Regulations to be mentioned amend the Arsenic in Food Regulations and increase the limit for the amount of arsenic which may be present in brewers' yeast which is to be used for manufacturing yeast products.

On pages 29 and 31 reference is made to the presumptive standards of quality for milk and to the special standard for the milk-fat content of Channel Islands milk. Mention is also made here of the recommendations of the Cook Committee, on the composition of milk, which published its report in September of the year under review. It is interesting to note how the averages for fat and solids-not-fat for

samples of Channel Islands milk, taken in the County, compare with the same averages for samples of ordinary milk. Channel Islands milks showed an average of 4.78 per cent. milk-fat and 9.04 per cent. solids-not-fat whereas ordinary milks yielded averages of 3.64 per cent. for milk-fat and 8.66 per cent. for solids-not-fat.

As in previous years it has been found that a number of pre-packed foods did not conform to the requirements of the Labelling of Food Order and brief details of these will be found in the section of the report dealing with the Order and in table 21. Many of the samples showed only minor infringements of the Regulations but more detailed reference is made to certain samples which showed unusual irregularities, these included a Tonic Wine, Creamed Rice with Sultanas, Lard, Ice Lollies, Ice-Cream and a Dextrose preparation. The composition of ice-cream (table 22) and of dairy ice-cream (page 70) was maintained at a satisfactory level during the year under review. All the County samples except one, which was only slightly deficient in fat, satisfied the requirements of the Food Standards (Ice Cream) Regulations. On page 74 will be found reference to samples of flour examined for compliance with the requirements of the Flour (Composition) Regulations and comment is also made here on the recommendations of the Food Standards Committee in their Report on the composition of Flour and Bread which was published in November, 1960. Particular mention should also be made of samples of oil tainted canned Salmon (page 77) and of lead and tin contaminated samples of imported canned Tomato Paste (page 78).

On pages 80 and 83 will be found mentioned of a number of samples found to contain extraneous matter or insects. Most of these samples were the result of complaints by members of the general public and the number submitted under these headings is almost identical with the number similarly submitted in the previous year. Nine of the County samples were the subject of prosecutions and details of these together with some of the other more interesting samples will be found in this part of the report.

Part III of the report deals with the examination of samples under the Fertiliser and Feeding Stuffs Act, and here again, as in the case of the examination of samples of Special Designation milks, new Regulations have come into operation during the year under review and have introduced more modern methods of analysis, particularly for phosphoric acid and potash determinations.

The work on Radioactivity commenced in September of the year 1958, has been continued and is described in Part V of the report.

It is reassuring to note that the amount of Strontium 90 deposited by rainfall in the year under review was only one-fifth of the corresponding amount found in the year 1959 and the amount of the same isotope found in milk during 1960 was only one-half of that found in the previous year. This is, of course, due to the fact that no large nuclear explosions have taken place since November, 1958. There were two small explosions in the Sahara during the year under review; the Strontium 90 from these was detectable in this country in both rainfall and in milk but the amount was small compared with that still being deposited from the heavy explosions prior to 1959.

The number and variety of samples now being examined in the County Laboratory has again placed very heavy demands on the members of the staff and I wish to take this opportunity of expressing my appreciation of the efficient manner in which they, both analytical and clerical, have carried out their duties. The ready co-operation of the Sampling Officers, both of the County and of the Autonomous Food and Drugs Authorities, has also greatly facilitated the smooth running of the laboratory.

In conclusion, I wish to tender to the members of the County Council and to the County Medical Officer of Health my most grateful thanks for their continued encouragement and support.

I have the honour to be, Mr. Chairman, Ladies and Gentlemen,

Your obedient Servant,

GEO. H. WALKER,

County Analyst.

The County Laboratory,
County Hall,
Preston.

3rd August, 1961.

TOTAL SAMPLES EXAMINED

During the year 1960, a total of 13,458 analyses and tests have been carried out in the County Laboratory. They are classified in the following table :—

Table 1

County Samples—

Food and Drugs Act (including 5,051 milks)	...	7,857
Appeal-to-Cow	... ..	12
Fertilisers and Feeding Stuffs Act, 1926	... ..	45
Food and Drugs Act samples (including forty Appeals - to - Cow) from the following autonomous Food and Drugs Authorities—		
County Borough of Barrow-in-Furness	...	184
Borough of Chorley	... ..	48
Borough of Darwen	... ..	103
Urban District of Huyton-with-Roby	...	272
City of Lancaster	... ..	102
Borough of Leigh	... ..	150
Borough of Middleton	... ..	164
Borough of Morecambe and Heysham	...	188
Urban District of Newton-le-Willows	...	83
County Borough of Preston	... ..	620
County Borough of Southport	... ..	310
County of Westmorland	... ..	142
	—	2,366
Fertilisers and Feeding Stuffs Act, 1926—		
Preston County Borough	... ..	4
Southport County Borough	... ..	5
County of Westmorland	... ..	16
Other Samples (from all sources including the County) —		
Potable Waters	... ..	86
Other Waters and Effluents	... ..	48
Miscellaneous	... ..	409
Milk Samples.—Phosphatase Tests	... ..	1,182
Milk Samples.—Methylene Blue Tests	... ..	1,181
Milk Samples.—Turbidity Tests	... ..	247

Total number examined ... 13,458*

*Seventy-one of these samples were examined for Radioactivity.

The total number of samples analysed in the year is compared with the total numbers similarly classified for the previous years 1912-1959, in table 2. It will be seen from the table that, since the year 1912, the grand total of samples examined amounts to 335,877

Table 2
Total number of Samples examined during the years 1912 to 1960

Year	County Food and Drugs	Other Authorities Food and Drugs	County Appeal-to-cow Samples	Other Authorities Appeal-to-cow Samples	Fertilisers and Feeding Stuffs Act	Waters and Effluents	Miscellaneous and Departmental	Total Phosphate, Methylene Blue and Turbidity Tests	Total
1912-1948	169496	4633	2295	84	817	2414	2944	2181	184864
1949	7700	1060	53	10	52	77	98	1425	10475
1950	8104	1040	38	1	58	113	149	1595	11098
1951	8501	1337	28	9	54	196	203	1602	11930
1952	8622	1418	40	12	53	126	208	1745	12224
1953	8635	1345	50	11	59	112	237	1797	12246
1954	8089	1612	67	3	62	84	250	1949	12116
1955	8373	1983	49	5	76	118	288	2463	13355
1956	8215	2177	27	11	59	120	328	2508	13445
1957	8239	2007	77	2	80	121	387	2499	13412
1958	8225	2110	55	5	86	95	414	2445	13435
1959	8256	2394	18	3	87	129	445	2487	13819
1960	7857	2326	12	40	70	134	409	2610	13458
1912-1960	268312	25442	2809	196	1613	3839	6360	27306	335877

PART I.—SAMPLES TAKEN UNDER THE FOOD AND DRUGS ACT, 1955

During the year under review the following new Regulations, which have a bearing on the work of the Public Analyst, have been made :—

The Milk (Special Designation) Regulations, 1960.

The Meat (Staining and Sterilization) Regulations, 1960.

The Arsenic in Food (Amendment) Regulations, 1960.

The Skimmed Milk with Non-Milk Fat Regulations, 1960.

The first of the above Regulations is referred to in Part II of this report while the remaining new Regulations are briefly discussed below.

The Meat (Staining and Sterilization) Regulations, 1960, came into force on the 1st November, 1960, and they require that all butchers meat which is unfit for human consumption shall be sterilized and that

all knacker meat shall be either stained or sterilized before being distributed. There are certain specific exceptions which relate to meat intended for any processor, manufacturing chemist, medical or veterinary school, or for any menagerie, etc. The staining of meat is required to be carried out with a solution of either Acid Green E.C., Napthalene Green, Acid Green G or a similar colour having the formula of Colour Index No. 666. The Minister may approve the use of other colouring matters for this purpose.

The Arsenic in Food (Amendment) Regulations, 1960, increase from 2·0 to 5·0 parts per million the amount of arsenic which may be present in Brewers' yeast intended for use by manufacturers of yeast products.

The Skimmed Milk with Non-Milk Fat Regulations, 1960, will come into operation on the 19th September, 1961; they control the the labelling and advertising of certain specified foods intended for sale for human consumption, i.e., "skimmed milk with non-milk fat" and the corresponding condensed or dried products. Labels are required to bear the words "skimmed milk with non-milk fat" and "unfit for babies." There are certain specified alternatives to these words; in particular, where the kind and amount of fat present is declared the words "should not be used for babies except under medical advice" may be used. The Second Schedule to the Regulations contains a short list of products which are exempt from any declaration about baby feeding as long as they conform to the standards of composition laid down in the Schedule. Two of the most important conditions are that not less than 12 per cent. of the total fatty acids present in the food shall be poly-unsaturated fatty acids of the cis-cis form and there shall be no ingredient present which is devoid of nutritional value. If any claim is made on a label in relation to coronary diseases then the label is also required to bear a declaration of the specific names and amounts of each fat or oil present together with a statement as to whether each fat or oil is hydrogenated. The regulations prohibit the use of descriptions on labels, or in advertisements, in relation to specified foods or beverages which contain skimmed milk, which are suggestive of milk or of anything connected with the dairy interest. The regulations do not apply to sales by a caterer for immediate consumption on his premises and the Condensed Milk Regulations 1959, and the Public Health (Dried Milk) Regulations, 1923 to 1948, do not apply to any specified food. The Regulations are to be enforced by Food and Drugs Authorities and they will not be required to give notice to the Minister of any intention to institute proceedings in respect of offences.

*Particulars of Samples of Food and Drugs submitted by County
Sampling Officers*

In table 3 there is a list of all the articles of food and drugs which were submitted during the year 1960, from the County of Lancaster together with the number of each kind and also the number found to be adulterated.

Table 3

Samples examined under the Food and Drugs Act during 1960

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Almonds, Ground		17		17		2		2
Almond Oil		8		8				
Ammoniated Mercury Ointment		7		7				
Arrowroot		9		9				
Aspirin Tablets		26		26				
Aspirin Tablets, Soluble ...		5		5				
Aspirin Tablets, Children's ...		7		7		1		1
Bacon		16		16				
Baking Powder		14		14				
Barley		12		12				
Beer, Bottled and Canned ...		5		5				
Biscuits		4		4		2		2
Black Beer and Raisin Wine...		1		1				
Blackcurrant Syrup		1		1				
Blancmange Powder		7		7				
Boric Acid		13		13				
Boric Acid Ointment		9		9		1		1
Borax		18		18		4		4
Borax and Honey		1		1				
Brandy	8			8				
Bread		34		34		8		8
Bread, Brown		5		5				
Bread and Butter		1		1				
Bread Sauce, Powder		1		1				

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Breakfast Cereals		13		13				
Butter		49		49		1		1
Cake Decorations, Edible ...		14		14				
Cake Covering, Chocolate ...		1		1				
Cake Mixture, Sweetened ...		3		3				
Camphorated Oil		13		13		2		2
Caraway Seeds		1		1				
Cascara, Liquid Extract ...		1		1		1		1
Castor Oil		23		23				
Catarrh Tablets		1		1				
Cheese (including Processed Cheese)		44		44				
Cheese, Cream		1		1		1		1
Cheese Spread		1		1				
Chestnut Spread		1		1				
Chicken Fillets, Canned ...		1		1		1		1
Chicken Fillets, etc., in Jelly, Bottled or Canned ...		5		5		1		1
Chicken Spread... ..		1		1				
Chicory and Coffee Extract Mixture, Dry... ..		1		1				
Chocolate, Drinking		5		5				
Christmas Tree Decorations, Edible		6		6				
Chutney		3		3				
Cider Vinegar		2		2				
Cinnamon, Ground		2		2				
Cocoa		17		17				
Coconut, Desiccated		2		2				
Codeine Tablets, Compound ...		18		18				
Cod Liver Oil		11		11		1		1
Cod Liver Oil Emulsion ...		1		1				

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Coffee		10		10				
Coffee Extract, Dry		11		11				
Coffee and Chicory Essence, Liquid, Sweetened		15		15				
Coffee and Chicory		1		1				
Coffee and Chicory Extract, Mixture, Dry... ..		1		1				
Cold, Medicine for		1		1				
Condiment, non-brewed		1		1				
Cooking Fat		23		23				
Cooking Oil		8		8				
Cornflour		8		8				
Cough Medicine		24		24		1		1
Cream, Single and Double		16		16		1		1
Cream, Sterilized		3		3				
Cream, Whey		1		1				
Curry Mixture, Canned		1		1				
Curry Powder		1		1				
Custard Powder		17		17		1		1
Dandelion Coffee		1		1				
Dripping		16		16		1		1
Dusting Powder (Zinc Oxide and Boric Acid)		3		3				
Epsom Salts		16		16				
Figs, Compound Syrup of		12		12				
Fish, Bottled and Canned		51		51		4		4
Fish Cakes		3		3		1		1
Fish Dressing		1		1				
Fish Paste		22		22		2		2
Fish, Potted		4		4				
Flavouring Materials		12		12				
Flour		20		20		4		4

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Flour, Self-raising		15		15				
Flour Confectionery		66		66		9		9
Fruit, Canned		31		31				
Fruit, Curd		22		22		4		4
Fruit, Dried		66		66		7		7
Fruit, Fresh (Oranges, Apples, etc.)		23		23				
Fruit Juices, Bottled and Canned		12		12		1		1
Gelatine		6		6				
Gin	14			14				
Ginger, Ground... ..		4		4				
Glucose Drink		1		1				
Glucose Tablets		1		1				
Glycerin		1		1				
Glycerin of Borax		1		1				
Golden Raising Powder		8		8				
Gravy Browning		20		20		1		1
Gravy Powder		1		1				
Gravy Salt		3		3				
Halibut Oil Capsules		1		1				
Headache Powders		7		7		4		4
Headache Tablets		2		2				
Health Salts		16		16		1		1
Herbal Medicine		1		1				
Herbal Tablets		2		2				
Herbs, Dried, Culinary		6		6				
Honey		18		18				
Horseradish Sauce		1		1				
Hypophosphites, Compound Syrup of		10		10		2		2
Ice-Cream		22		22		2		2

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Ice-Cream, Dairy		2		2				
Ice-Cream, Cold Mix Powder...		1		1				
Ice Lollies		8		8		4		4
Indigestion Mixture		2		2				
Indigestion Powders		5		5				
Indigestion Tablets		6		6				
Iodine, Tincture of		10		10				
Jam		30		30		2		2
Jam, Diabetic		2		2				
Jelly, Invalid (jar)		1		1				
Jelly, Table		39		39				
Jelly, Table, Compound ...		3		3				
Lard		28		28		1		1
Laxatives (Chocolate, Chewing Gum, etc.) ...		12		12				
Liquorice Powder, Compound...		6		6		1		1
Liver, Lambs		1		1				
Liver and Bacon Croquettes ...		1		1				
Lotion, Calamine, Oily, B.P.C.		1		1				
Macaroni, Spaghetti and Similar Products		2		2				
Magnesia, Milk of		1		1				
Malt Extract		1		1				
Malt Extract with Cod Liver Oil		10		10				
Malt, Milk and Cocoa Beverages		10		10				
Margarine		19		19		1		1
Marmalade		30		30				
Marzipan		9		9				
Meat, Canned		30		30		3		3
Meat, Cooked		8		8		1		1

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Meat and Egg, Canned ...		2		2		1		1
Meat Extract		1		1				
Meat Paste		9		9				
Meat Pies		66		66		3		3
Meat and Potato Pie		1		1		1		1
Meat, Potted		12		12		5		5
Meat Pudding, Canned ...		1		1				
Meat and Vegetables, Canned		2		2				
Medicated Waterproof Dressing		1		1		1		1
Milks	2746	2050	255	5051	93	70	15	178
Milk, Channel Islands	205	66		271	4	3		7
Milk Condensed, Full Cream, Sweetened		1		1				
Milk, Condensed, Full Cream Unsweetened		5		5		1		1
Milk, Condensed, Skimmed, Sweetened		1		1				
Milk, Condensed, Special Full Cream, Sweetened		1		1				
Milk, Dried, Full Cream ...		2		2				
Milk, Dried, Skimmed ...		1	1	2			1	1
Milk Shake Powder		1		1				
Milk Shake Syrup		2		2				
Milk and Malt Beverage ...		1		1				
Mincemeat		22		22				
Mint Sauce		2		2				
Mock Caviar		1		1				
Mouth Ulcer Pastilles and Tablets		2		2				
Muffins		1		1				
Mustard, Compound		3		3				
Mustard, Liquid		5		5				

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Nasal Inhaler		1		1				
Nasal Oil		1		1				
Nutmeg, Ground		4		4				
Nuts		4		4				
Oatcakes		1		1				
Oatmeal		18		18		2		2
Oats, Breakfast		5		5				
Olive Oil		21		21				
Olives, Stuffed		3		3				
Onion Sauce Powder		1		1				
Pancake and Yorkshire Pudding Mixture		2		2				
Paraffin, Liquid		17		17				
Paraffin, Liquid, Emulsion, with Phenolphthalein		2		2				
Parrish's Chemical Food		16		16		4		4
Penicillin Tablets		9		9				
Pepper, White		33		33				
Pepper-flavoured Compound		1		1				
Petroleum Emulsion with Hypophosphites		1		1				
Pickles		38		38		3		3
Pie Filling, Flavoured		2		2				
Pudding, Christmas, etc.		22		22		2		2
Pudding Mixture, Sweetened		6		6				
Pudding Mixture, Unsweetened		3		3				
Quinine, Ammoniated Tincture of		7		7		4		4
Rice		2		2				
Rice Flour		1		1				
Rice, Ground		2		2				
Rose Hip Syrup		2		2		2		2

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Rum	7			7				
Rum Butter		3		3				
Sago		7		7		4		4
Salad Cream		21		21				
Salad Oil		1		1				
Salmon Spread, Smoked ...		1		1				
Salt		7		7				
Sauce		52		52				
Sausages, Pork	1	45		46	1	16		17
„ Beef		29		29		8		8
„ Cumberland (includes 1 Canned)		3		3		3		3
„ Tomato		1		1		1		1
„ Canned		6		6		1		1
„ Liver... ..		1		1				
„ with Beans, Canned		1		1				
Sausage Meat, Pork		2		2		2		2
„ „ Beef		2		2				
Sedative Tablets		1		1				
Seidlitz Powders		6		6		3		3
„ „ Extra Strong		3		3				
Semolina		8		8				
Sodium Bicarbonate		11		11				
Soft Drinks, to be diluted ...		22		22				
„ „ Mineral Waters ...		30		30		1		1
„ „ Orange Drinks ...		13		13		2		2
Soft Drink Powder		2		2				
Soup, Canned		17		17				
Soup Mixture, Dried		1		1				
Soup Powder		3		3				
Spice, Mixed, Ground		8		8				

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Sponge Cake and Sponge ... Pudding Mixture, Sweetened		16		16				
Stout 		2		2				
Suet, Shredded 		13		13				
Sugar 		31		31		1		1
Sugar, Icing 		6		6				
Sulphadimidine Tablets ...		1		1				
Sulphur Ointment 		7		7				
Sulphur Tablets 		1		1				
Sweets (including Chocolates and Sweets containing Butter)		68		68		5		5
Sweetmeats 		3		3				
Syrup 		10		10				
Tapioca 		4		4				
Tartare Sauce 		2		2				
Tea 		61		61				
Tea Extract, Dry 		3		3				
Teething Powders 		4		4				
Throat and Cough Lozenges ...		10		10				
Throat Spray 		1		1				
Tomato Juice, Canned ...		1		1				
Tomato Paste, Canned ...		7		7		6		6
Travel Sickness Tablets ...		10		10				
Treacle and Molasses 		9		9		1		1
Vegetables, Canned 		16		16				
Vegetables, Dehydrated ...		2		2				
Vegetables, Dried (Peas, etc.)		17		17		2		2
Vegetables, Fresh 		5		5				
Vegetables with Meat, Bottled 		1		1				
Vinegar 		19		19		1		1
Vinegar, Malt, Distilled ...		2		2				

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Vitamin Food		1		1				
Vitamin Syrup		2		2				
Vitamin Capsules and Tablets		25		25		1		1
Whisky	31			31				
Wine (British Sherry, British Ruby, etc.) ...		11		11				
Yeast, Dried		1		1		1		1
Yeast Tablets		2		2				
Yoghourt		1		1				
Zinc and Castor Oil Ointment		1		1				
Zinc Ointment		9		9		1		1
Totals	3012	4589	256	7857	98	247	16	361

The Number of Commodities

The variety of commodities on sale is now very large, and this is reflected in the number of different articles of which samples have been taken and submitted for analysis. Two hundred and sixty two different commodities consisting of food and drugs were examined during the year.

In order to obtain adequate sampling of the common articles of food it is the practice to issue quarterly lists of samples which assist the sampling officers to correlate their samples one with another and at the same time ensure that each area is satisfactorily sampled in respect of any particular commodity. Due to the desirability of allowing considerable latitude in the sampling of other articles where this may be indicated in the public interest, the variety of samples actually examined is considerably increased by the inclusion of commodities in less common demand.

Total Adulteration

During the year under review, 7,857 samples of food and drugs were submitted for examination under the Act, and of these 361 were reported upon adversely; the total adulteration was, therefore, 4·6 per cent. This is almost the same as the percentage of adulteration for the previous year (1959) when the figure was 4·5 per cent.

In table 4 the percentages of adulteration are given for the past 10 years. It will be seen that during this period the lowest figure is 4.1 which was reached during the year 1956 and that the average figure is 4.6 per cent. The figure for the year under review is, therefore, identical with the average for the last 10 years. In general, the adulteration during and subsequent to the war was considerably greater than that found in preceding years; while the figure for the year under review cannot be regarded as unsatisfactory when compared with the figures for the last 10 years, it is, however, higher than the adulteration rate for the 10 years 1929-1938, which preceded the war when the percentage adulteration varied from 2.6 to 4.2.

Table 4

*Percentage of Adulteration of County Samples of Food and Drugs,
1951-1960*

Year				Total No. of Samples	No. of Adulterated Samples	Percentage of Adulteration
1951	...	...	...	8,501	412	4.8
1952	...	...	...	8,622	404	4.7
1953	...	...	...	8,635	386	4.5
1954	...	...	...	8,089	417	5.1
1955	...	...	...	8,373	413	4.9
1956	...	...	...	8,215	340	4.1
1957	...	...	...	8,239	349	4.2
1958	...	...	...	8,225	405	4.9
1959	...	...	...	8,256	373	4.5
1960	...	...	...	7,857	361	4.6
1951-1960	...	...	...	83,012	3,860	4.6

Analysis of County Food and Drugs Samples

Table 5 gives the percentage of adulteration over the last 10 years side by side with the various types of samples and with the number of samples taken per 100,000 of the population. The total number of samples and the number of samples per 100,000 of the population for the year under review have been well maintained at the level reached during the year 1947 (6,819 and 505 respectively) and the figures for all subsequent years are much higher than the corresponding figures for any of the previous years in the history of the County Laboratory.

Table 5

Year	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Percentage of Adulteration ...	4.8	4.7	4.5	5.1	4.9	4.1	4.2	4.9	4.5	4.6
Total Samples ...	8,501	8,622	8,635	8,089	8,373	8,215	8,239	8,225	8,256	7,857
Formal Samples	2,751	2,654	3,220	2,817	3,300	3,474	3,331	3,337	3,321	3,012
Informal Samples	5,184	5,313	4,761	4,844	4,744	4,404	4,589	4,568	4,627	4,589
Private Samples	566	655	654	428	329	337	319	320	308	256
Number of Samples per 100,000 of the population	589	599	598	593	613	594	588	581	576	548

Total Adulteration : the County compared with other Areas

Table 6 gives the percentage of adulteration for the year 1960 for certain other Food and Drugs Authorities whose figures were available at the time of writing. I am indebted to the Public Analysts of the various districts for the information included in this table and also for the figures included in tables 13 and 17. It will be seen that the figure for the County of Lancaster, *viz*, 4.6 per cent. is a little higher than the average (3.8 per cent.) for the Authorities mentioned. The range of adulteration for the areas included in the table varied from 7.2 to 1.2 per cent.

Table 6

Total Adulteration, 1960. Various Districts.

Area	No. of Samples	Per cent. of Adult.	Area	No. of Samples	Per cent. of Adult.
Durham, County ...	2,890	1.3	Bristol ...	4,116	3.1
Kent, County ...	4,739	6.9	Leeds... ...	3,628	3.0
Somersetshire County ...	3,737	4.7	Leicester ...	2,391	3.2
Staffordshire, County ...	5,501	2.5	Liverpool ...	4,135	5.0
Worcestershire, County ...	5,760	7.2	Manchester ...	2,949	3.3
Birmingham ...	5,700	1.2	Portsmouth ...	1,594	4.6

Adulteration in County Districts, etc.

There are 93 Districts shown in the Area of the County Food and Drugs authority for the year under review.

Table 7 shows the number of samples taken and the number of adulterated samples in each of the 93 districts together with those relating to 12 autonomous areas. An examination of the table will show that adulteration was nil in 17 of the County Districts as against nil in 15 districts for the year 1959. None of the autonomous areas showed a total freedom from adulteration.

Table 7

Adulteration in the County Districts and in the areas of 12 Autonomous Food and Drugs Authorities during the year 1960.

District	Milk		Other Articles		Total	
	Samples	Adult.	Samples	Adult.	Samples	Adult.
Abram U.D.C.	12	0	12	0	24	0
Adlington U.D.C.	14	0	12	0	26	0
Ashton-in-Makerfield U.D.C. ...	56	0	49	2	105	2
Aspull U.D.C.	7	0	18	1	25	1
Atherton U.D.C.	69	0	31	2	100	2
Audenshaw U.D.C.	38	1	23	2	61	3
Bacup Borough	60	3	32	3	92	6
Barrowfield U.D.C.	19	1	6	0	25	1
Billinge and Winstanley U.D.C.	14	1	16	0	30	1
Blackburn R.D.C.	53	1	21	2	74	3
Blackrod U.D.C.	5	2	11	1	16	3
Brierfield U.D.C.	23	0	12	3	35	3
Burnley R.D.C.	59	0	21	1	80	1
Carnforth U.D.C.	11	1	12	0	23	1
Chadderton U.D.C.	104	0	59	6	163	6
Chorley R.D.C.	87	2	56	9	143	11
Church U.D.C.	22	1	8	0	30	1
Clayton-le-Moors U.D.C. ...	28	8	9	0	37	8
Clitheroe Borough	39	2	22	0	61	2

Table 7—continued.

District	Milk		Other Articles		Total	
	Samples	Adult.	Samples	Adult.	Samples	Adult.
Clitheroe R.D.C.	55	12	13	4	68	16
Crompton U.D.C.	40	0	29	3	69	3
Dalton-in-Furness U.D.C. ...	32	2	20	2	52	4
Denton U.D.C.	83	6	58	10	141	16
Droylsden U.D.C.	89	0	44	7	133	7
Failsworth U.D.C.	63	1	34	4	97	5
Farnworth Borough	92	3	48	3	140	6
Fleetwood Borough	79	2	61	2	140	4
Formby U.D.C.	39	0	16	0	55	0
Fulwood U.D.C.	44	2	32	2	76	4
Fylde R.D.C.	47	3	33	2	80	5
Garstang R.D.C.	65	2	24	2	89	4
Golborne U.D.C.	63	0	44	1	107	1
Grange U.D.C.	12	1	11	2	23	3
Great Harwood U.D.C. ...	38	0	17	0	55	0
Haslingden Borough	49	5	24	0	73	5
Haydock U.D.C.	29	0	20	1	49	1
Heywood Borough	85	1	54	9	139	10
Hindley U.D.C.	53	1	23	0	76	1
Horwich U.D.C.	27	3	46	0	73	3
Ince-in-Makerfield U.D.C. ...	62	0	28	4	90	4
Irlam U.D.C.	45	0	30	6	75	6
Kearsley U.D.C.	40	0	16	2	56	2
Kirkby U.D.C.	158	2	70	3	228	5
Kirkham U.D.C.	32	1	5	0	37	1
Lancaster R.D.C.	48	0	30	0	78	0
Lees U.D.C.	23	0	18	1	41	1
Leyland U.D.C.	44	1	49	2	93	3
Litherland U.D.C.	105	0	21	1	126	1
Little Lever U.D.C.	21	0	12	0	33	0

Table 7—continued

District	Milk		Other Articles		Total	
	Samples	Adult.	Samples	Adult.	Samples	Adult.
Littleborough U.D.C. ...	42	4	21	0	63	4
Longridge U.D.C. ...	20	3	6	1	26	4
Lunesdale R.D.C. ...	24	1	13	0	37	1
Lytham St. Annes Borough ...	89	1	72	3	161	4
Milnrow U.D.C. ...	37	0	14	0	51	0
Mossley Borough ...	35	1	21	3	56	4
North Lonsdale R.D.C. ...	123	13	30	2	153	15
Nelson Borough ...	91	4	69	3	160	7
Ormskirk U.D.C. ...	69	0	28	1	97	1
Orrell U.D.C. ...	27	0	19	0	46	0
Oswaldtwistle U.D.C. ...	84	0	14	0	98	0
Padiham U.D.C. ...	23	0	27	3	50	3
Poulton-le-Fylde U.D.C. ...	31	0	24	2	55	2
Preesall U.D.C. ...	7	0	5	1	12	1
Prescot U.D.C. ...	42	1	18	0	60	1
Preston R.D.C. ...	124	8	89	6	213	14
Prestwich Borough ...	105	4	69	6	174	10
Radcliffe Borough ...	86	4	57	2	143	6
Rainford U.D.C. ...	16	0	16	0	32	0
Ramsbottom U.D.C. ...	42	0	27	0	69	0
Rawtenstall Borough ...	81	1	39	2	120	3
Rishton U.D.C. ...	16	1	14	0	30	1
Royton U.D.C. ...	42	1	28	3	70	4
Skelmersdale U.D.C. ...	10	0	14	0	24	0
Standish-with-Langtree U.D.C.	21	0	16	0	37	0
Thornton Cleveleys U.D.C. ...	49	0	36	0	85	0
Tottington U.D.C. ...	31	0	11	0	42	0
Trawden U.D.C. ...	10	0	5	1	15	1
Turton U.D.C. ...	45	0	30	3	75	3
Tyldesley U.D.C. ...	62	0	28	0	90	0

Table 7—continued.

District	Milk		Other Articles		Total	
	Samples	Adult.	Samples	Adult.	Samples	Adult.
Ulverston U.D.C.	26	3	25	2	51	5
Up Holland U.D.C.	19	1	9	0	28	1
Urmston U.D.C.	115	4	91	7	206	11
Walton-le-Dale U.D.C....	60	6	31	0	91	6
Wardle U.D.C.	20	2	16	0	36	2
Warrington R.D.C.	136	0	52	3	188	3
West Lancashire R.D.C. ...	127	5	110	4	237	9
Westhoughton U.D.C.	49	1	27	2	76	3
Whiston R.D.C.	127	1	65	5	192	6
Whitefield U.D.C.	30	0	37	3	67	3
Whitworth U.D.C.	24	0	15	3	39	3
Wigan R.D.C.	65	0	14	0	79	0
Withnell U.D.C.	13	0	5	1	18	1
Worsley U.D.C.	96	4	89	6	185	10
Miscellaneous	278	33	0	0	278	33
Total County Districts ...	5,051	178	2,806	183	7,857	361
Twelve Autonomous food and Drugs Authorities	1,196	71	1,130	107	2,326	178
Total—All Sources	6,247	249	3,936	290	10,183	539

Adulteration of Milk in the County

The number of milks submitted under the Food and Drugs Act during the year was 5,051, and of these 178 were reported against ; the amount of adulteration was, therefore, 3·5 per cent. This figure, as will be seen from table 8, is lower than the average for the last 10 years and together with the figure for the year 1957 is the lowest shown in the table.

Table 8

Percentage of Adulteration of Milk Samples, 1951-1960

Year				No. of Samples	No. of Adulterated Samples	Percentage of Adulteration
1951	...	...	...	5,811	291	5.0
1952	...	...	...	5,804	298	5.1
1953	...	...	...	5,872	281	4.8
1954	...	...	...	5,115	287	5.6
1955	...	...	...	5,637	273	4.8
1956	...	...	...	5,497	203	3.7
1957	...	...	...	5,411	190	3.5
1958	...	...	...	5,385	231	4.3
1959	...	...	...	5,294	198	3.7
1960	...	...	...	5,051	178	3.5
Total ...				54,877	2,430	4.4

The Adulteration of Milk in the County for each month of the year

In table 9 will be found the figures for the number of milk samples submitted by County Sampling Officers during each month of the year together with the number adulterated and the percentage adulteration. In general the percentage adulteration usually increases during late winter and decreases in the autumn. The increasing adulteration of milk noted during the winter and first half of the year may be due to two factors : (a) the poorer quality of milk towards the end of the winter enables cases of slight adulteration to be detected more readily and, (b) the scarcity of milk in the winter may, in some instances, be an incentive to adulteration.

Table 9

Milk.—Monthly Adulteration, 1960

Month	Number of Samples	Number Adulterated	Percentage of Adulteration
January	495	14	2·8
February	503	23	4·6
March	349	24	6·9
April	348	14	4·0
May	492	21	4·3
June	221	12	5·4
July	513	13	2·5
August	514	9	1·7
September	290	11	3·8
October	495	8	1·6
November	542	12	2·2
December	289	17	5·9
Total ...	5,051	178	3·5

In the following table will be found particulars of the various types of adulteration and the number of samples under each heading :—

Table 10

			<i>Per cent.</i>
Milks deficient in fat only	100	<i>or</i>	1·98
Milks containing added water only	62	<i>or</i>	1·22
Milks deficient in fat and containing added water	7	<i>or</i>	0·13
Milks containing foreign matter, etc.	9	<i>or</i>	0·17
Milks containing preservatives	Nil	<i>or</i>	Nil
Milks containing colouring matter	Nil	<i>or</i>	Nil
	178	<i>or</i>	3·50
Milks containing more than 3 per cent. added water	22	<i>or</i>	0·43
Milks 10 per cent. or more deficient in fat ...	26	<i>or</i>	0·51

Alternatively the milk adulteration can be expressed in terms of the adulteration of the various grades of milk as shown in the following table.

Table 11

Grade of Milk	Number of Samples	Number Adulterated	Percentage of Adulteration
Pasteurised	1,248	15	1.20
Tuberculin Tested (Pasteurised) ...	1,026	7	0.67
Sterilized	515	5	0.97
Tuberculin Tested ...	1,850	95	5.13
†Raw	412	56	13.59
*Channel Islands (all grades)	271	7	2.58

† Will include raw designated milks not submitted as such.

* The figures for Channel Islands Milks are included here for completeness but for all other purposes in this report they are considered separately as they come under Regulations of their own, see page 31.

It will be noted from table 11 that all the heat treated milks show a lower rate of adulteration than the types of raw milk. This is primarily because heat treated milks are normally bulked before processing and irregularities in individual churns or consignments may thereby be obscured. As against this the high adulteration rate for raw undesignated milks is weighted by the selective sampling of a number of milks, taken on delivery to processing dairies, which were the subject of complaint by the dairy managements.

“ Serious ” Milk Adulteration

A study of table 10 reveals that 0.94 per cent. or approximately one-quarter of the total milk adulteration may be considered “ serious.” This figure includes 22 samples which contained added water and 26 samples which were deficient in fat. A number of these seriously adulterated samples were taken informally and could not, therefore, be the subject of prosecutions. In several other instances corresponding appeal-to-cow samples of poor quality were submitted by the Sampling Officers. Prosecutions were recommended, however, in respect of seven samples. In addition, one other sample, which was the subject of a prosecution, was found to contain extraneous matter.

In table 12 are given details in regard to the adulterated milk samples, submitted by County Sampling Officers, which were the subject of legal proceedings, together with the results of the prosecutions.

Table 12
Milk Prosecutions, 1960

Number of Sample	Nature of Adulteration or Irregularity	Observations
C.3648	Deficient 10·4 per cent. solids-not-fat ; freezing point indicated 8·9 per cent. extraneous water.	Section 32 Food and Drugs Act, 1955. Fined £15 and £9.2.0 costs.
C.5050	Deficient 6·4 per cent. solids-not-fat ; freezing point indicated 6·3 per cent. extraneous water.	Section 2 Food and Drugs Act, 1955. Fined £10 and £5.19.0 costs.
6058.S	Deficient 18·3 per cent. fat.	Section 2 Food and Drugs Act, 1955. Fined £5 and £5.19.0 costs.
E.5057	Contained twenty-five fragments of broken glass weighing in all 0·076 gramme.	Section 2 Food and Drugs Act, 1955. Fined £10 and £8.10.0 costs.
N.3685	Deficient 6·6 per cent. fat and 15·5 per cent. solids-not-fat ; freezing point indicated 15·1 per cent. extraneous water.	Section 2 Food and Drugs Act, 1955. Fined £20 and £7 costs.
N.3686	Freezing point indicated 2·3 per cent. extraneous water.	
N.3687	Deficient 11·3 per cent. solids-not-fat ; freezing point indicated 8·5 per cent. extraneous water.	
N.3688	Deficient 8·9 per cent. solids-not-fat ; freezing point indicated 8·5 per cent. extraneous water.	

Adulteration of Milk : the County compared with Other Areas

In the following table the percentage of milk adulteration for the year 1960 is given for a number of districts in England whose figures were available at the time of writing. The corresponding figure for the County of Lancaster was 3·5 per cent., as against 3·7 per cent. in the year 1959 and 4·3 per cent. in the year 1958. The percentage of milk adulteration in the County for the year under review is very slightly higher than the average (3·1 per cent.) for the areas included in the table. The rate of adulteration in these districts varied from 9·1 to 0·5 per cent.

Table 13

Milk Adulteration, 1960. Various Districts

Area	Number of Samples	Per cent. of Adult.	Area	Number of Samples	Per cent. of Adult.
Durham, County ...	1,258	0·8	Leeds... ...	2,775	1·8
Kent, County ...	1,244	5·5	Leicester ...	1,467	1·4
Somersetshire, County ...	1,329	2·9	Liverpool ...	2,660	4·8
Staffordshire, County ...	3,992	1·2	Manchester ...	1,317	5·3
Worcestershire, County ...	4,780	9·1	Portsmouth ...	391	2·5
Birmingham ...	2,948	1·3	Salford ...	790	0·5

The Standards of Quality for Milk

In some countries there is a definite standard of quality required for liquid milk sold to the public ; it is then illegal to sell milk which is below that standard. In this country the law is less stringent. The present Food and Drugs Act contains no standards for milk. The position remains very much as it was before this Act came into operation, in that the one requirement laid down by law is that milk must be sold to each purchaser in the condition in which it came from the cow. If it attains a certain limit or exceeds it, may to be regarded as above suspicion, and if it is below that limit it only becomes suspect, and it falls to the lot of the person who sold it to establish, if he can, before the Court that nothing has been added to it, or no ingredient abstracted from it.

In furtherance of the principle outlined in the preceding paragraph, presumptive limits for the composition of milk were established after exhaustive enquiries by a Government Committee appointed by the Board of Agriculture in 1900. The outcome of the deliberations of this Committee was the production of the Sale of Milk Regulations, 1901, which were modified as regards skimmed milk in 1912. These Regulations were reproduced, in effect unaltered, in October 1939, in the Sale of Milk Regulations, 1939, and they have been continued in force

by the Food and Drugs Act, 1955. They are as follows :—

(1) Where a sample of milk (not being milk sold as separated, or condensed, milk) contains less than 3 per cent. of milk-fat, it shall be presumed for the purposes of the Food and Drugs Act, 1955, until the contrary is proved, that the milk is not genuine, by reason of the abstraction therefrom of milk-fat, or the addition thereto of water.

(2) Where a sample of milk (not being milk sold as separated, or condensed, milk) contains less than 8·5 per cent. of milk-solids other than milk-fat, it shall be presumed for the purposes of the Food and Drugs Act, 1955, until the contrary is proved, that the milk is not genuine, by reason of the abstraction therefrom of milk-solids other than milk-fat, or the addition thereto of water.

(3) Where a sample of separated milk (not being condensed milk) contains less than 8·7 per cent. of milk-solids other than milk-fat, it shall be presumed for the purposes of the Food and Drugs Act, 1955, until the contrary is proved, that the milk is not genuine, by reason of the abstraction therefrom of milk-solids other than milk-fat, or the addition thereto of water.

The above presumptive standards with regard to the composition of milk have, therefore, been operative for almost 60 years. Within recent years, however, they have been under a considerable amount of criticism, implying that they do not accord with present day conditions. Another Government Committee was, therefore, appointed during the year 1958 to consider the composition of milk from the standpoint of human nutrition and animal husbandry and to recommend any changes in legislation considered desirable. This Committee under the Chairmanship of Dr. J. W. Cook published its report in September of the year under review. It recommends as far as standards of composition are concerned, that milk should still be sold as it comes from the cow but that within ten years a fixed minimum standard of 8·5 per cent. solids-not-fat should apply to milk sold by retail. Similarly, for milk on sale to the consumer the presumptive standard of 3 per cent. for milk-fat should, within five years, be made an absolute minimum standard and the abstraction of fat from milk intended for sale as whole milk should be a specific legal offence. Another recommendation is that the Hortvet Freezing Point Test should be accepted in legal proceedings as proof (subject to certain provisos) of the presence or absence of extraneous water.

Channel Islands Milk and South Devon Milk

In addition to the presumptive standards of quality, which are applicable to all milk, a special standard for milk-fat of not less than four per cent. was originally prescribed in the Milk (Control and Maximum Prices) (Great Britain) Order, 1947, for "Channel Islands Milk" and for "South Devon Milk." The enforcement of this standard was the responsibility of the Ministry of Agriculture, Fisheries and Food, but during the year 1956, the Milk and Dairies (Channel Islands and South Devon Milk) Regulations came into operation and made food and drugs authorities responsible for enforcing the standard. "Channel Islands Milk" and "South Devon Milk" are defined by the Milk (Great Britain) Order, 1959, as being milk (a) which is produced from cows of the Channel Islands or South Devon Breeds and (b) which is labelled "Channel Islands Milk," "Jersey Milk," "Guernsey Milk" or "South Devon Milk" when sold in a container. This last Order also prescribes maximum prices for Channel Islands and South Devon Milk. The enforcement of the maximum price is still the responsibility of the Ministry of Agriculture, Fisheries and Food, and Food and Drugs authorities are, therefore, requested to report to the Ministry details of any samples of Channel Islands and South Devon Milk sold at the higher price prescribed which are found to contain less than four per cent. of fat. This is, of course, in addition to any enforcement action in regard to fat deficiency which the Food and Drugs authority may, itself, decide to take. During the year, 1960, 317 samples of Channel Islands Milk were examined (271 were submitted by County Sampling Officers, and 46 by Autonomous Authorities). They were found upon analysis to have an average milk fat content of 4.78 per cent. and an average solids-not-fat content of 9.04 per cent. Of the 317 samples examined 307 were satisfactory. Of the 10 unsatisfactory samples (seven County) No's. C.3773, E.5134, N.2955, C.5166 and C.5167 were found to have milk fat contents of only 3.80, 3.70, 3.85, 3.80 and 3.80 per cent. respectively. Follow-up samples were taken in each case and were found to be genuine. The two remaining unsatisfactory County samples No's. E.4718 and 6293.S were found to have milk-fat contents of 3.85 and 3.80 per cent. respectively. Both vendors were cautioned but follow-up samples could not be taken as the two vendors ceased to retail Channel Islands milk in the County Area. Two samples from one vendor submitted by an Autonomous Authority were found to have milk-fat contents of only 3.40 and 3.80 per cent. respectively and, in addition, the latter sample was found to contain 0.3 per cent. extraneous water. Legal proceedings against the supplier resulted in him being fined £5. The remaining sample submitted by an Autonomous Authority was found to contain 0.8 per cent. extraneous water. The vendor was cautioned

but a follow-up sample could not be obtained subsequently as this particular supply ceased in the area concerned.

The Average Composition of Milk during the Year

Genuine milk has not always the same composition. There are natural variation in the amounts of both fat and solids-not-fat in milk as drawn from the cow. It, therefore, becomes a matter not only of interest but also of importance and significance, to know the average values for these two constituents. This information is given for the year 1960 in table 14, where it will be seen that the average figure for fat is 3.64 per cent., for solids-not-fat 8.66 per cent. and for total solids 12.30 per cent.

It should be pointed out that the average compositions and frequencies included in this section of the Report are calculated from the results of all the samples of milk (other than Channel Islands milk) received; that is to say, there are included all adulterated samples and further, all appeal-to-cow samples, whether they were above or below the limits for fat and solids-not-fat laid down by the Sale of Milk Regulations. The figures for average composition calculated on this basis will, therefore, tend to be somewhat lower than those for genuine milk sold in the County.

Table 14
Average Composition of Milk, 1960

Month	Number of Samples*	Fat per cent.	Solids-not-fat per cent.	Total Solids per cent.
January ...	495	3.58	8.60	12.18
February ...	1,351 { 502	3.56 { 3.57	8.60 { 8.61	12.16 { 12.18
March ...	354	3.52	8.59	12.11
April	348	3.51	8.61	12.12
May ...	1,065 { 496	3.51 { 3.51	8.67 { 8.71	12.18 { 12.22
June ...	221	3.51	8.68	12.19
July ...	513	3.63	8.65	12.28
August ...	1,317 { 514	3.65 { 3.62	8.68 { 8.67	12.33 { 12.29
September ...	290	3.73	8.74	12.47
October ...	495	3.86	8.75	12.61
November ...	1,329 { 543	3.82 { 3.84	8.68 { 8.67	12.50 { 12.51
December ...	291	3.69	8.60	12.29
Whole year ...	5,062	3.64	8.66	12.30

* Includes Appeal-to-Cow samples but does not include Channel Islands milk and one sample of Milk examined for foreign matter only.

The Average Composition of Milk for each Month of the Year

Table 14 also includes the figures for the averages of fat and solids-not-fat for each month of the year. As regards fat it will be seen that April, May and June have the lowest figure, 3.51 per cent., and October the highest, 3.86 per cent. In respect of solids-not-fat, the lowest figure was obtained in March, 8.59 per cent., the highest in October, the figure then being 8.75 per cent. These variations, particularly in respect of fat content, have been the general experience for many years, the fat content usually being at its lowest in the spring and at its highest in the autumn. Solids-not-fat tend to be lower in the winter.

The Average Composition of Morning and Evening Milk during the Year

Usually, when samples are submitted, the information is given whether they are morning or evening milks. It has, therefore, been possible to classify them so as to show the average composition of morning and evening milks separately.

When cows are milked at the usual intervals the evening milk, due to the shorter interval, is richer in fat than the morning milk, while there is little if any difference as a rule in solids-not-fat. This is illustrated in table 15 below, where the average fat for morning milk is 3.58 per cent., and the evening fat 3.95 per cent.; the fat in the evening milk being greater by 0.37 per cent., while the averages for solids-not-fat are very similar for both morning and evening milk.

Table 15

*The Average Composition of Morning and Evening Milk
during the Year*

	Number of Samples*	Fat per cent.	Solids-not-fat per cent.	Total solids per cent.
Morning Milk...	1,096	3.58	8.66	12.24
Evening Milk...	656	3.95	8.69	12.64
Mixed Milk ...	110	3.62	8.61	12.23
Unknown ...	3,200	3.60	8.65	12.25
Total ...	5,062	3.64	8.66	12.30

* Includes Appeal-to-Cow samples but does not include Channel Islands milk and one sample of Milk examined for foreign matter only.

The Average Composition of Milk : compared with past years

In table 16 the average composition of all the milks examined is set out for the period 1910-1960. It will be seen that the average figure for fat does not vary greatly from year to year although the figure for the year under review is the second lowest of any shown in the table. In respect of solids-not-fat there is very little difference in the averages for the years 1910-1940. Since 1940, however, it will be noted there is an appreciable decrease in solids-not-fat, the lowest figure of 8.55 per cent. being obtained in the year 1943. The average for solids-not-fat for the year under review was 8.66 per cent, while the average for the whole period for which records have been kept is 8.81 per cent. Since the year 1943 there has been, in general, a tendency for solids-not-fat to show an upward trend but they are still appreciably below the pre-war figures.

Footnote for Table 16 on opposite page

* Does not include Channel Islands milk and 13 samples of Milk examined for foreign matter only.

Table 16
Average Composition of Milk, 1910-1960

Year	Number of Samples	Fat per cent.	Solids-not-fat per cent.	Total Solids per cent.
1910 to 1930 ...	56,028	3·67	8·90	12·57
1931	3,090	3·84	8·81	12·65
1932	3,205	3·77	8·85	12·62
1933	3,060	3·76	8·82	12·58
1934	3,310	3·74	8·81	12·55
1935	3,422	3·75	8·84	12·59
1936	3,098	3·73	8·88	12·61
1937	3,278	3·74	8·84	12·58
1938	3,398	3·70	8·78	12·48
1939	3,128	3·67	8·78	12·45
1940	2,144	3·70	8·79	12·49
1941	1,866	3·70	8·64	12·34
1942	1,516	3·75	8·66	12·41
1943	1,489	3·70	8·55	12·25
1944	1,197	3·69	8·57	12·26
1945	1,096	3·72	8·57	12·29
1946	2,776	3·75	8·58	12·33
1947	4,625	3·75	8·63	12·38
1948	4,523	3·67	8·64	12·31
1949	5,210	3·66	8·65	12·31
1950	5,362	3·68	8·67	12·35
1951	5,839	3·67	8·65	12·32
1952	5,844	3·67	8·68	12·35
1953	5,922	3·68	8·68	12·36
1954	5,182	3·71	8·65	12·36
1955	5,686	3·68	8·66	12·34
1956	5,524	3·71	8·59	12·30
1957	5,485	3·68	8·63	12·31
1958	5,439	3·68	8·63	12·31
1959	5,304	3·62	8·62	12·24
1960	5,062	3·64	8·66	12·30
1910 to 1960 ...	172,108*	3·71	8·81	12·52

Composition of Milk : the County compared with Other Areas

In table 17 below, figures are given for the composition of milk during the year 1960 in the areas of 12 other Food and Drugs Authorities. The corresponding figures for the County of Lancaster, based upon 5,062 samples of milk are fat 3·64 per cent., solids-not-fat 8·66 per cent., and total solids 12·30 per cent. It will be noted that the Lancashire figures for both fat and solids-not-fat are very slightly below the average results for the other areas listed, *viz.*, fat 3·66 per cent. and solids-not-fat 8·71 per cent.

Table 17

Composition of Milk, 1960. Various Districts

Area	Number of Samples	Fat per cent.	Solids-not-fat per cent.	Total Solids per cent.
Durham, County ...	1,326	3·69	8·67	12·36
Kent, County	1,244	3·60	8·75	12·35
Somersetshire, County ...	1,354	3·73	8·71	12·44
Staffordshire, County ...	4,028	3·72	8·74	12·46
Worcestershire, County	4,822	3·65	8·71	12·36
Birmingham	2,957	3·65	8·78	12·43
Leeds	2,790	3·70	8·73	12·43
Leicester... ..	1,467	3·61	8·66	12·27
Liverpool	2,660	3·68	8·74	12·42
Manchester	1,317	3·60	8·79	12·39
Portsmouth	391	3·72	8·55	12·27
Salford	790	3·62	8·68	12·30

The Composition of Milk : Frequencies

The 5,062 samples of milk examined for chemical composition during the year have been arranged in table 18 to show the number of samples having the same percentage of fat, or, in other words, the frequency with which each percentage of fat, differing by 0·1 per cent., occurred. The table has been shortened by placing in separate groups all samples containing less than 2·5 per cent. and above 3·9 per cent. This information is given for the whole year and for each month of the year.

This table gives different information than do figures for averages. It shows that, as in previous years, there are comparatively few samples below 3·0 per cent. It also shows how the figures from which the averages are calculated are distributed, information which is not obtainable from the figures for averages alone.

In this table, and the following one, table 19, all samples of milk are included, whether adulterated or not, and also all appeal-to-cow samples.

Table 18
Composition of Milk : Frequencies
Fat

Per cent.	Number of Samples												
	Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Under 2·5	0	0	1	1	1	2	1	0	0	0	0	3	9
2·5	1	0	1	1	0	0	0	0	0	1	0	0	4
2·6	2	0	2	1	0	1	1	1	1	0	0	0	9
2·7	0	3	0	1	5	1	2	0	0	0	0	0	12
2·8	2	7	5	2	6	2	6	7	1	1	1	4	44
2·9	2	8	1	4	4	2	2	2	5	0	2	0	32
3·0	14	17	15	3	19	5	8	8	6	5	7	4	111
3·1	12	20	10	9	15	5	11	12	7	5	8	6	120
3·2	22	16	13	22	48	14	20	23	8	4	9	8	207
3·3	33	26	27	44	73	19	39	28	3	11	28	11	342
3·4	53	55	56	69	89	41	67	47	12	11	16	17	533
3·5	122	156	103	74	82	56	95	117	33	25	31	34	928
3·6	103	78	50	44	52	25	82	121	57	57	52	70	791
3·7	30	29	19	20	26	11	55	50	72	87	86	50	535
3·8	29	17	13	17	16	12	33	19	26	98	116	31	427
3·9	20	9	10	8	11	9	25	13	14	52	57	15	243
4·0 and Over	50	61	28	28	49	16	66	66	45	138	130	38	715
Totals	495	502	354	348	496	221	513	514	290	495	543	291	5,062

Table 19 gives the frequencies for solids-not-fat. It has already been stated that the average figure for solids-not-fat for the year was 8.66 per cent., and the bulk of the individual figures for solids-not-fat are arranged closely around the average. Tables 18 and 19 bring out the further point that a much higher proportion of milks fall below the presumptive limit of 8.5 per cent. for solids-not-fat than fall below the presumptive limit of 3.0 per cent. for milk-fat.

Table 19
Composition of Milk : Frequencies
Solids-not-fat

Per cent.	Number of Samples												
	Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Under 7.8	0	0	1	1	2	0	0	0	0	0	0	5	9
7.8	0	0	0	0	0	0	0	0	0	0	0	1	1
7.9	0	0	2	0	1	0	0	0	0	0	1	0	4
8.0	1	3	4	0	2	0	0	0	0	0	0	0	10
8.1	3	3	2	1	1	1	0	0	0	1	1	2	15
8.2	3	4	6	3	1	1	1	2	1	2	1	1	26
8.3	16	14	12	4	4	1	8	4	2	2	11	3	81
8.4	43	38	27	29	8	4	28	28	9	5	24	25	268
8.5	149	142	99	78	49	31	113	82	29	18	88	63	941
8.6	163	163	117	117	115	84	151	188	55	98	155	120	1,526
8.7	64	75	46	73	165	51	126	108	78	178	155	36	1,155
8.8	39	42	17	29	95	28	44	60	66	126	66	21	633
8.9	10	10	14	7	40	15	25	25	29	36	29	12	252
9.0 and Over	4	8	7	6	13	5	17	17	21	29	12	2	141
Totals	495	502	354	348	496	221	513	514	290	495	543	291	5,062

Samples of Milk taken for Comparison

Part II of the Seventh Schedule of the Food and Drugs Act, 1955, contains certain provisions relating to the procuring of comparison samples of milk. Briefly, when a sample of milk is obtained from a vendor he must, if so requested, give to the Sampling Officer the name and address of the person from whom he, in turn, received the milk.

The vendor may also within 60 hours of the sample being taken, serve on the Food and Drugs Authority a notice stating the name and address of the person from whom he received the milk and the time and place of delivery to himself of milk from a corresponding milking, and requesting the Authority to procure, as soon as practicable, a sample of milk from a corresponding milking in course of transit or delivery to himself. The vendor shall have no right to request such a sample if the original sample procured from him was a mixture of milk produced on more than one dairy farm. In turn, the dairyman from whom such a sample of milk is procured in course of transit or delivery, may, within 60 hours after the sample was procured, serve on the Authority concerned a notice requesting that immediate steps be taken to procure a sample of milk from a corresponding milking of the cows. The person procuring this last sample shall be empowered to take such steps at the dairy as may be necessary to satisfy himself that the sample is a fair sample of the milk of the cows when properly and fully milked. It is the practice in the County for the Sampling Officers to take, in appropriate cases, follow-up and appeal-to-cow samples without a formal request being made by the vendor.

Appeal-to-Cow Samples

Appeal-to-cow samples, or, as they are sometimes called, "byre" samples, if the method of taking them is properly carried out in every detail, may be regarded in the light of a final appeal. The milking must be carefully supervised, it must be established that the same cows are milked, that it is the corresponding milking and the dairy equipment must be inspected to see that it is clean and dry. The results of analyses of samples procured in this way must be accepted as those pertaining to genuine milk. Appeal-to-cow samples serve at least two purposes. In the first place, they show, in cases where an unsatisfactory sample has been sold, the quality of the unadulterated milk given by the cows, and, secondly, extend our knowledge of the quality of the milk of different herds and of the natural variations which may occur in the composition of genuine milk.

It was with the former object in view that the practice of taking appeal-to-cow samples was instituted, *viz.*, to ascertain the composition of the milk given by the cows. It is now generally admitted that the composition of the milk from a herd of cows may occasionally fall below the limits laid down in the Sale of Milk Regulations, particularly at the morning milking. When such a milk is examined the question arises whether it is an unadulterated milk of poor quality, or a milk of normal composition which has been tampered with; the appeal-to-cow sample is intended to help to solve this problem.

In table 20, there is given a list of appeal-to-cow samples, submitted by County Sampling Officers during the year 1960, and also the results of analysis. Twelve such samples are included, representing four herds, the number of cows in the herds varying from 12 to 44.

In addition 40 appeal-to-cow samples were examined for autonomous authorities.

Analysis of Appeal-to-Cow Samples of Milk
Table 20

Number	Number of cows milked	Approx. yield gallons	Morning or Evening	Fat per cent.	Solids-not-fat per cent.	Freezing Point (Hortvet) °C	Taken for comparison with numbers	Observations
6063.S	8	9	M	3.72	8.36	—0.543	6058S.	Low in solids-not-fat.
6064S.	4	5½		3.90	8.46	—0.543		
6065S.	9	10		3.40	8.62	—0.542		Slightly low in solids-not-fat.
6066S.	11	9½		3.30	8.50	—0.540		
6067S.	12	12		3.55	8.81	—0.543		
1052	26	12	M	2.70	8.68	—0.539	N.2611	Poor in fat.
1053		9½		3.25	9.25	—0.541		
1054		12		3.40	8.98	—0.541		
1055		6		3.17	8.67	—0.544		
587	12	10	E	4.62	8.96	—0.550	C.5050	
1062	5	7	E	4.25	8.39	—0.541	N.3685 and N.3686	Low in solids-not-fat.
1063	7	8¼	E	4.00	8.88	—0.540		

An inspection of table 20 shows that the freezing point depression of the appeal-to-cow samples was determined in every case, and this gave valuable evidence of the authenticity of the samples. Although three of the appeal-to-cow samples were found to be naturally poor in solids-not-fat, in no such instance was the freezing point of the sample above -0.530°C (Hortvet), the figure which is usually accepted as the highest freezing point normally given by milk free from extraneous water. The freezing point of the 12 appeal-to-cow samples varied between -0.539°C (Hortvet) to -0.550°C (Hortvet); the average figure being -0.542°C (Hortvet). The average freezing points of appeal-to-cow samples examined during the five years 1955 to 1959 inclusive were -0.539°C ., -0.539°C ., -0.546°C ., -0.540°C and -0.540°C .

Milk Supplied to Schools, Day Nurseries, Children's Homes and Hostels for the Aged

The 255 samples of milk marked "Private" in table 3 were taken from consignments delivered to Schools, Day Nurseries, Children's Homes and Hostels for the Aged in the County. Fifteen of these samples were adulterated, corresponding to an adulteration rate of 5.9 per cent. This figure is higher than the total milk adulteration for the County which was 3.5 per cent.

Of the 255 samples, 238 were taken at Schools. Fifteen of these were found to be adulterated or otherwise unsatisfactory. Six samples were found to contain small amounts of extraneous water and the respective vendors were cautioned. Five samples were found to have fat deficiencies and the vendors were communicated with. Repeat samples taken in respect of two of the above samples were found to be genuine. The remaining four samples were found to contain extraneous matter; fragments of broken glass, a steel wire spring, a metal jet off a bottle-filling machine and a small amount of cement. Legal proceedings were instituted in respect of the sample containing broken glass and the supplier was fined £10 and £8.10.0 costs. The dairies supplying the three other samples containing extraneous matter were all cautioned.

Seven samples were taken at Day Nurseries, six samples at Children's Homes and four samples at Hostels for the Aged. All these samples were found to be satisfactory.

Samples of Milk deficient in solids-not-fat but genuine

Attention has already been drawn in the sections of this Report dealing with the "Standards of quality for milk," "Composition of Milk: Frequencies" and "appeal-to-cow" samples, to the fact that milk as it comes from the cow is not always of such quality as to comply with the minimum presumptive limits of 3.0 per cent. for milk-fat and 8.5 per cent. for solids-not-fat, of the Sale of Milk Regulations, 1939. In order to decide whether such samples submitted under the Food and Drugs Act were in fact as given by the cow, and therefore genuine, it is still necessary in the case of presumed fat deficiencies to make an actual comparison with an "appeal-to-cow" sample from a corresponding milking. Formerly, this was also the only means by which it could be decided whether a sample low in solids-not-fat was of naturally poor quality or whether it had been adulterated by the addition of water. For the past 30 years or so, however, it has been possible by submitting the sample to the Hortvet freezing point test for the Analyst to obtain additional evidence that a deficiency in solids-not-fat was due to the presence of extraneous water or, alternatively, that it was due to natural causes.

In the section of the revised Ministry of Health memorandum 36/Foods (1939), dealing with Public Analysts' quarterly reports, it is laid down that in the case of samples below the presumptive limits of the Sale of Milk Regulations, the report should show whether they were adjudged genuine by the Analyst on other grounds. It is now the normal procedure to submit all samples low in solids-not-fat to the Hortvet freezing point test and to include in the quarterly reports a table giving details of such samples which satisfactorily pass the test.

During the year under review, 343 County samples of milk were found to be poor in solids-not-fat, but were adjudged genuine by the Hortvet freezing point test. This figure corresponds to 6·8 per cent. of the total milk samples (including "appeal-to-cow") submitted by County Sampling Officers. These poor quality milks were distributed over the year as follows :—152 in the March quarter, 50 in the June quarter, 81 in the September quarter and 60 in the December quarter. The samples were not, therefore, confined to any particular season of the year, although the greatest number was obtained towards the end of the winter and the lowest in the spring and late autumn. The lowest figure for solids-not-fat shown by any of these samples was 7·95 per cent., the next lowest being 8·05 per cent.

Each year it is usual to find an appreciable number of milk samples which are poor in solids-not-fat but are nevertheless adjudged genuine as the result of applying the Hortvet freezing point test. The number of such samples, *viz.*, 6·8 per cent., submitted during the year under review is lower by 6·0 per cent. than for the year 1959, when the figure was 12·8 per cent. In the five years preceding the year 1959 the percentage of milk samples coming under this heading varied from 6·5 to 11·2 per cent.

It will be noted that the percentage of milk samples poor in solids-not-fat but genuine by the freezing point test for the year 1960, *viz.*, 6·8 per cent., although 6·0 per cent. lower than for the previous year, is still high when compared with the percentage of adulterated milk samples for the same year, *viz.*, 3·5 per cent. The difference is even more striking when it is considered that the last mentioned figure includes all samples containing extraneous water and all samples containing less than 3·0 per cent. milk-fat whether or not, in the latter instance, the corresponding appeal-to-cow samples indicated that the fat deficiencies were actually due to abstraction or merely to natural causes.

The relatively high proportion of milks found to be naturally deficient in solids-not-fat, which is by no means confined to Lancashire, is undoubtedly one of the factors which influenced the Government to

appoint a Committee in the year 1958 to consider the Composition of Milk. (The findings of this Committee are referred to in the section of this report dealing with “ The Standards of Quality for Milk.”)

Adulteration of Articles other than Milk

During the year under review there were examined for the County 2,806 samples other than milk ; of these 183 were reported against, this corresponds to an adulteration rate of 6·5 per cent., which is higher than the figure obtained in the year 1959, when it was 5·9 per cent. The percentage of adulteration in articles other than milk for the year under review, was much higher than that for milk, *viz.*, 3·5 per cent. An examination of tables 3 and 21 shows that sausages, samples containing extraneous matter and samples whose labels did not conform to the requirements of the Labelling of Food Order contributed especially to the overall adulteration rate.

Table 21 gives a list of the articles other than milk submitted by County Sampling Officers which were found to be unsatisfactory with particulars of the type of adulteration and the action taken.

Samples, other than Milk, Adulterated or otherwise giving rise to Irregularity

Table 21

No. of Sample	Description	Formal Informal or Private	Nature of Adulteration or Irregularity	Observations
E.4465	Flour	Informal	Contained 490 milligrams creta praeparata per 100 grammes of flour. Limits are 235-390 milligrams per 100 grammes.	Millers communicated with.
E.4486	Cream Cheese	Informal	Consisted of Curd Cheese and not Cream Cheese.	Vendor interviewed and cautioned.
C.3244	Custard Powder	Informal	Salt omitted from voluntary list of ingredients.	Old packet. Salt included in list of ingredients on new packets.
5426.S	Pork Sausages	Informal	Meat content 63 per cent.	Poor in meat content.
E.4510	Borax	Informal	Contained eight parts per million of arsenic i.e., four parts per million of arsenic in excess of B.P. maximum limit. Should be labelled “ Household Borax—not to be used internally.”	Vendor interviewed

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
5502.S	Butter	Informal	Water content 16.2 per cent. Maximum permitted limit 16 per cent.	No further stock available. Further sample from fresh supply genuine.
C.3330	Bread (Milk Roll)	Informal	Contained only 1.8 per cent. skim milk solids. Recommended minimum is 4.2 per cent. whole milk or skim milk solids.	Bakers agreed to amend formula for mixing.
E.4611	Pork Sausages	Informal	Contained 130 parts per million sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
E.4614	Pork Sausages	Informal	Meat content 54.5 per cent.	Poor in meat content.
N.2363	Cumberland Sausages	Informal	Contained 87 per cent. meat (declared 90 per cent. meat).	No action advised.
N.2382	Compound Syrup of Hypophos- phites.	Informal	Should be labelled "Syrup of Hypophosphites Compound" not "Syrup of Hypophosphates" as on original label. Also anhydrous quinine only 0.133 per cent. w/v (limits 0.186–0.206 w/v).	Remainder of stock withdrawn from sale.
E.4672	Pork Sausages	Informal	Meat content only 55 per cent. Contained 275 parts per million sulphite preservative (expressed as sulphur dioxide) without declaration	Poor in meat content. Vendor interviewed re preservatives.
E.4673	Beef Sausages	Informal	Meat content only 46.5 per cent. Contained 245 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Poor in meat content. Vendor interviewed re preservatives.
N.2419	Double Cream	Informal	Cream contained 2.8 parts per million formaldehyde. Carton yielded 545 parts per million formaldehyde.	Advised cartons be withdrawn. Dairy and Carton Manufacturers communicated with.
5603.S	Flour	Informal	Vitamin B ₁ 0.21 milligram per 100 grammes (limit not less than 0.24 milligram). Nicotinic Acid 1.5 milligrams per 100 grammes (limit not less than 1.6 milligrams).	No action advised.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.4718	Jersey Milk	Formal	Fat content only 3.85 per cent.	Farmer interviewed.
N.2439	Bread	Informal	Butter or milk solids-not-fat not detected yet the word butter included in the description.	Bakers communicated with
C.3493	Lemon Juice Pasteurised	Informal	Vitamin C content 11.8 milligrams per fluid ounce (claimed not less than 15 milligrams per fluid ounce) and contained fungus inside cap and on surface of liquid.	Remainder of stock withdrawn from sale.
C.3503	Camphorated Oil	Informal	Contained 22.3 per cent. camphor. B.P. limits 19–21 per cent.	Stock withdrawn from sale and new supply obtained.
C.3564	Pork Sausage	Informal	Contained 195 parts per million sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor communicated with.
E.4867	Compound Syrup of Hypophosphites	Informal	Should be labelled “Compound Syrup of Hypophosphites” not “Compound Syrup of Hypophosphates” as on original label.	Vendor notified.
C.3663	Borax	Informal	Contained 22 parts per million arsenic i.e., 18 parts per million in excess of B.P. limit.	Labelled “Household Borax”. Vendor agreed to add words “not for internal use.”
C.3662	Black Cherry Linctus	Informal	Ascorbic acid content not more than 0.001 per cent. Label declaration states 0.03 per cent.	Old stock. Withdrawn from sale and replaced. Ascorbic acid no longer included in the formula.
5993.S	Fish, Canned	Informal	Contained 370 parts per million tin.	See No. 6038.S
6038.S	Fish, Canned	Informal	Sample consisted of three cans with tin contents of 370, 405 and 400 parts per million respectively.	Remainder of retailer's stock withdrawn from sale and packers communicated with
E.5056	Camphorated Oil, B.P.	Informal	Contained artificial colouring matter. This is not official in Camphorated Oil B.P.	Vendor communicated with

Table 21—continued.

No. of Sample	Description	Formal Informal or Private	Nature of Adulteration or Irregularity	Observations
E.5026	Potted Beef	Informal	Meat content 72·5 per cent. Added water 27·5 per cent. Potted meat should contain meat and seasoning only and should not contain added water.	Vendor interviewed.
C.3773	Jersey Milk	Formal	Deficient 5 per cent. fat.	Producer cautioned Further sample genuine.
6129.S	Seidlitz Powders B.P.	Informal	Sample consisted of three powders. Contents of two white packets weighed 2·99 and 2·77 grammes respec- tively. B.P.C. limits for white packets 2·25–2·75 grammes. Should no longer be labelled B.P.	Packers notified. Stock withdrawn from sale.
E.2763	Cheese Savoury Biscuits	Informal	Contained 0·4 gramme of biscuit debris matted with paper fibres.	Complainant informed.
E.5073	Flour Con- fectionery	Informal	Contained one dead house- fly weighing 30 milli- grams.	Section 2 Food and Drugs Act, 1955. Fined £10 and £10.7.0 costs.
6127.S	Medicated Waterproof Dressing	Informal	Described on sale card as “Medicated Waterproof Dressing” but wrapper did not bear the quantitative particulars of the active constituents or ingredients contrary to Section 11 of the Pharmacy and Medi- cines Act, 1941.	Packers communi- cated with.
E.5088	Beef Sausages	Informal	Contained 180 parts per million sulphite preserva- tive (expressed as sulphur dioxide) without declaration	Vendor interviewed.
E.5087	Pork Sausages	Informal	Meat content only 58·5 per cent.	Poor in meat con- tent.
E.5094	Salmon Paste	Informal	Fish content only 62 per cent.	Further sample genuine.
C.3828	Creamed Rice with Sultanas, Canned	Informal	No sultanas found.	Stock belonging to same batch with- drawn from sale in retailer's shop. See also sample C.3869.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
6186.S	Turkish Delight	Informal	Red portion of sample coloured by non-permitted colouring matter of the nature of Rhodamine B.	Packers communicated with. Remainder of stock withdrawn from sale.
E.5134	Channel Islands Milk	Informal	Deficient 7.5 per cent. fat.	Vendor cautioned. Further sample genuine.
C.3869	Creamed Rice with Sultanas, Canned.	Informal	No sultanas present.	See sample No. C. 3828.
E.5190	Aspirin Tablets, Children's	Informal	Free salicylic acid present equal to two-and-a-half times the B.P. maximum limit.	Stock withdrawn from sale.
E.5192	Meat, Potted	Informal	Meat content 84 per cent. Added water 16 per cent. Potted meat should contain meat and seasoning only and should not contain added water.	Vendor interviewed.
3901.S	Opened can of meat	Informal	Contained three fragments of wood weighing in all 0.93 gramme.	Packers cautioned.
E.2766	Two slices of Battenberg Cake with foreign objects.	Informal	Contained the head and thorax and, separately, the abdomen of a four-winged insect of the nature of a honey bee weighing 0.13 gramme.	Bakers cautioned.
E.5222	Part of a small cake	Informal	Contained one dead small beetle 3 mm. long of the nature of Ptinus Tectus and 15 animal hairs.	Complainant notified and Bakery visited.
C.3921	Seidlitz Powders, B.P.	Informal	Should no longer be labelled B.P. Contents of blue packets caked and overweight (10.7 to 11.0 gms.). Maximum limit for blue packets 10.5 gms. Appearance of old stock.	Vendor communicated with.
6293.S	Channel Islands Milk	Formal	Deficient 5 per cent. fat.	Producer cautioned

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.5215	Meat, Potted	Informal	Contained 42 per cent. meat and 50 per cent. excess water. Appearance of a meat brawn and should not be sold as potted meat.	Vendor interviewed.
E.5242	Beef Sausage	Informal	Contained 140 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
6309.S	Dried Yeast	Informal	Contained 230 parts per million copper. Recommended maximum limit is 120 parts per million.	No further stock available.
C.3962	Rose Hip Syrup	Informal	Labelling of Food Order requires declaration of Vitamin C in milligrams per fluid ounce (not per ml).	Old stock. Correct label now in use.
E.5280	Seidlitz Powders, B.P.	Informal	Should no longer be labelled B.P.	Packers notified.
6334.S	Portion of Steak and Kidney Pie containing a piece of wire.	Informal	Contained a piece of brass wire approximately 3 inches long and 0.022 inch in diameter which weighed 0.16 gramme.	Sections 2 and 113 (3) Food and Drugs Act, 1955. Fined £10 and £5.19.0 costs.
C.956	Part of a meat and potato pie with foreign object.	Informal	Contained a piece of iron ribbon weighing 0.013 gramme similar to a piece of a metal pan-scrub.	Bakers cautioned.
C.3972	Part of a Steak and Kidney Pie containing foreign matter.	Informal	Contained a piece of skin and subcutaneous tissue with adhering hair weighing in all 2.98 grammes.	Section 2, Food and Drugs Act, 1955. Fined £10 and £12.2.0 costs.
6348.S	Pork Sausages	Informal	Meat content 64.5 per cent.	Very slightly poor in meat content.
E.5308	Part filled tin of Condensed Full Cream Milk, Unsweetened	Informal	Acidity 0.6 per cent. Tin 390 parts per million. Tin recommended maximum limit 250 parts per million.	Further sample genuine.

Table 21—continued.

No. of Sample	Description	Formal Informal or Private	Nature of Adulteration or Irregularity	Observations
C.4027	Boric Acid Ointment, B.P.C.	Informal	Contained only 0·70 per cent. Boric Acid. B.P.C. limit 0·9–1·1 per cent. Boric Acid.	Vendor and Manufacturer communicated with. Stock withdrawn from sale.
N.2547	Lard	Informal	Contained butylated hydroxyanisole. Declaration on label refers to butylated hydroxytoluene.	Packers communicated with.
E.5304	Double Concentrated Tomato Paste.	Informal	Contained 12 parts per million lead.	See also sample E. 5330.
E.5330	Double Concentrated Tomato Paste (2 Cans)	Informal	First can contained lead 16·7 parts per million. Second can contained lead 3·3 parts per million. Recommended limit for lead is 5 parts per million.	See also E.5304. Stock withdrawn from sale and wholesalers communicated with.
E.5340	Purified Borax	Informal	Borax is a non-permitted preservative for food, therefore, direction on label for use as a food preservative is a contravention of Regulation 5 of the Public Health (Preservatives, etc., in Food) Regulations.	Stock withdrawn from sale.
E.5335	Sweets	Informal	Red sweets coloured by non-permitted colouring matter of the nature of Rhodamine B.	See also sample E. 5371. Stock withdrawn from sale. Manufacturers destroying present stock of colours and replacing with new ones.
E.5307	Salmon Canned (2 Cans)	Informal	Sample had taint (taste only) of mineral oil. Mineral oil recovered 125 parts per million of the sample	See also sample E.5329. Referred to Local Authority concerned.
E.5329	Salmon Canned (4 Cans)	Informal	Two had strong taint (odour and taste) of mineral oil. Mineral oil recovered 310 and 255 parts per million respectively. The other two cans had taint (taste only) of mineral oil. Mineral oil recovered 140 and 70 parts per million respectively.	See also sample E.5307.

Table 21—continued.

No. of Sample	Description	Formal Informal or Private	Nature of Adulteration or Irregularity	Observations
N.2650	Orange Drink	Informal	No name and address of packer on the carton.	Vendor interviewed.
E.5371	Sweets	Informal	Red component of colouring matter consisted of a non-permitted colour of the nature of Rhodamine B.	Same manufacturer as sample E.5335.
6425.S	Sausages	Informal	One of the three sausages contained part of a black animal hair 0.95 inch long and weighing 0.0015 gramme.	Vendor interviewed and Local Authority informed.
N.2682	Lemon Cheese.	Informal	Soluble solids 63.2 per cent. (should be 65 per cent.). No declaration of net weight on label.	Vendor interviewed and Weights and Measures Inspector informed.
N.2700	Sago	Informal	Consisted of Tapioca.	Vendor notified.
E.5396	Concentrated Tomato Paste (2 Cans)	Informal	1st Can contained 190 parts per million tin. 2nd Can contained 500 parts per million tin. Recommended maximum limit 250 parts per million.	Further sample from same stock advised. See No. E.5531.
C.4094	Remains of a packet of Fish Cakes.	Informal	Contained a vegetable fibre 4.5 cm. long and weighing 1 mgm. of the nature of jute together with 3 small pieces of fish bone. Sample otherwise genuine.	Complainant informed.
E.5458	Sago	Informal	Five pearls of Sago were dyed with a non-permitted colour of the nature of methyl violet. Possibly derived from marking sacks.	No action advised.
C.4167	Butter Toffee.	Informal	Butter fat content only 2.7 per cent. Code of Practice requires not less than 4 per cent. butter fat.	Vendor notified.
N.2875	Cumberland Sausage.	Informal	Contained 86.5 per cent. meat (declared 90 per cent. meat).	No action advised.
6548.S	Borax B.P.	Informal	Borax by B.P. Assay 110.0 per cent. B.P. maximum limit 103.0 per cent.	Apparently old stock. Vendor notified.
C.4209	Part of a Cake.	Informal	Contained a dead house-fly.	Bakery cautioned.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
C.957	Bridge Buns	Informal	Three fragments of dis- coloured dough together weighing 0·016 gramme containing free carbon to- gether with traces of iron and zinc were baked into the crust of the rolls.	Bakers interviewed and cautioned.
N.2919	Zinc Ointment, B.P.	Informal	Contained 13·7 per cent. zinc oxide. B.P. limits 14·0 –16·0 per cent.	Manufacturers tak- ing steps to prevent a recurrence.
E.5530	Pork Sausages	Informal	Meat content only 33·5 per cent.	See formal sample, E.5580.
E.5531	Tomato Paste	Informal	Contained 575 parts per million tin. Maximum limit 250 parts per million.	Same brand as E.5396. No further stock available.
E.5532	Tomato Paste (4 Cans)	Informal	Contained 460 parts per million tin. Recommended maximum limit 250 parts per million.	Same stock as E.5581.
E.5602	Part of a Meat Pie.	Informal	Contained a fly of the nature of a blow fly. Fly was not cooked with the pie.	Complainant notified.
C.4254	Compound Liquorice Powder	Informal	Sulphur content only 4·9 percent. Compound Liquor- ice Powder B.P.C. should contain 8 per cent. sulphur.	Vendor took steps to ensure that there is no recurrence.
E.5581	Tomato Paste (4 Cans)	Informal	1st Can 370 parts ; 2nd Can 600 parts ; 3rd Can 380 parts ; 4th Can 500 parts per million tin. Recom- mended maximum limit 250 parts per million.	Same brand as E.5532. Stock withdrawn from sale.
E.5592	Sago	Informal	Consisted of Tapioca.	Vendor notified.
N.2955	Channel Islands Milk.	Formal	Deficient 3·75 per cent. fat.	County Institute of Agriculture notified. Further sample genuine.
E.5580	Pork Sausages.	Formal	Consisted of Beef Sausages of meat content 65 per cent.	See also sample E.5530. Vendor interviewed and cautioned.
N.2978	Chicken Fillets, Canned	Informal	Contained 74 per cent. chicken and 26 per cent. added water. Should be labelled " Chicken Fillets in Chicken Stock."	Manufacturers agreed to alter label.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.5666	Parrish's Chemical Food B.P.	Informal	Should be labelled Chemical Food B.P.C. Contained only 0.19 per cent. w/v calcium. B.P.C. limits 0.50 to 0.58 per cent. calcium.	Remainder of stock withdrawn from sale.
C.4311	Pork Sausages.	Informal	Contained 190 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed. Further sample genuine.
N.2968	Mineral Water.	Informal	Contained 9 parts per million of chlorophenols with traces of detergent and traces of deposit derived from bottle cap.	Manufacturers interviewed and cautioned.
N.2977	Meat and Egg, Canned.	Informal	Contained 300 parts per million tin. Maximum recommended limit 250 parts per million.	Vendor communicated with. Further sample genuine.
N.2751	Jam	Informal	Soluble solids 64.8 per cent. (should be 68.5 per cent.). No declaration of name of food or declaration of vendors name and address and no declaration of net weight	Vendor interviewed and Weights and Measures Inspector informed.
N.2756	Vitamin C. Tablets.	Informal	Contained 29 mgms. Vitamin C. per tablet. (B.P. limits 22.5 mgms. to 27.5 mgms.)	No action advised.
E.5689	Pork Sausage	Informal	Meat content only 56 per cent.	Poor in meat content.
E.5718	Lemon Cheese.	Informal	No address of packer on label.	See also No. N.2776.
N.2776	Lemon Cheese.	Informal	No address of packer on label.	Same vendor as Sample No. E.5718. Vendor interviewed and cautioned.
E.5720	Portion of cake and foreign object submitted separately.	Informal	Contained a broken-off portion of a very rusty iron nail measuring $\frac{7}{8}$ -inch long.	Bakers interviewed and cautioned.
6772.S	Pork Sausage Meat.	Informal	Meat content 64.0 per cent.	Slightly poor in meat content.

Table 21—continued.

No. of Sample	Description	Formal Informal or Private	Nature of Adulteration or Irregularity	Observations
6812.S	Vegetables Dried (Peas)	Informal	Approximately 5 per cent. of the peas were severely marked by insect damage—several contained insect excreta and webbing.	Remainder of stock withdrawn from sale.
N.3003	Ice Lollies.	Informal	Labelled with a name likely to suggest the presence of cream. Sample contained ordinary ice-cream.	Packers agreed to alter label.
6824.S	Ice-Cream	Informal	Contained an insignificant amount of milk fat. Wrapper did not bear the required declaration "Contains non-milk fat."	Manufacturers no longer making this type of ice-cream.
N.3019	Oatmeal	Informal	Contained a live flour moth grub with webbing.	Vendor interviewed.
N.3046	Oatmeal	Informal	Contained four live insect grubs and cocoons.	Vendor interviewed.
6858.S	Dried Peas.	Informal	Contained a steeping tablet of sodium carbonate without any declaration of ingredients on label.	Packers agreed to alter label.
E.5838	Treacle.	Informal	Contained 40 parts per million of copper. Recommended limit 20 parts per million.	Packers took steps to prevent recurrence of excess copper.
E.5872	Potted Meat.	Informal	Contained 3 per cent. cereal filler and 15 per cent. excess water. Potted meat should contain meat and seasoning only.	Vendor interviewed and cautioned.
E.2767	Part of bovine oesophagus containing foreign matter.	Informal	Contained coarsely divided and partly digested cereal and grass fragments weighing in all 1.4 grammes.	Section 2, Food and Drugs Act, 1955. Fined £5 and £8.7.0 costs.
UUDC /1B	Part of sliced loaf of bread.	Informal	Contained two pieces of discoloured, used, transparent adhesive tape measuring approximately 1 inch x $\frac{3}{8}$ -inch and 1 inch x $\frac{1}{4}$ -inch, together weighing 0.13 gm.	Bakers interviewed and cautioned.
N.3043	Ice Lolly	Informal	Sample consisted of four ice lollies containing milk powder, one of which bore a label appropriate to an ordinary fruit lolly.	The one ice lolly in question was incorrectly labelled in error.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
N.3047	Cakes	Informal	Labelled with a name likely to suggest the presence of cream whereas filling consisted of marshmallow.	Manufacturers communicated with
N.3069	Pork Sausages, Canned.	Informal	Contained only 59 per cent. meat. Poor in meat content	Manufacturers undertook to take steps to ensure that meat content exceeds 65 per cent. in future.
N.3091	Pork Sausages.	Informal	Contained 30 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
E.5858	Meat, Canned (Lunch Meat)	Informal	Meat content only 55.5 per cent.	Packers decided to describe commodity as "Lunch Meat Loaf" in future.
C.4496	Cod Liver Oil.	Informal	Vitamin A activity only 350 units/gm. B.P. requires not less than 600 units/gm.	No further stock available. Old stock.
C.4500	Pork Sausage.	Informal	Contained 270 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
E.6022	Cumberland Pork Sausages, Canned.	Informal	Meat content only 55 per cent.	Manufacturers taking steps to ensure that there is no recurrence of poor meat content.
E.6073	Parrish's Chemical Food B.P.	Informal	Should be labelled Chemical Food B.P.C.	Packers agreed to alter labels.
C.4555	Lemon Cheese.	Informal	No name of food. No name and address of packer. No declaration of net weight. Soluble solids only 60.4 per cent. (should be 65 per cent.).	Packers interviewed.
C.4550	Cream Cake	Informal	"Cream" filling consisted of Imitation Cream.	Bakers interviewed and cautioned.

Table 21—continued.

No. of Sample	Description	Formal Informal or Private	Nature of Adulteration or Irregularity	Observations
C.4552	Ice Lollies	Informal	Submitted in a plain open paper bag. Should be labelled with the name of the food, the name and address of the packer and a list of ingredients.	Vendor interviewed.
C.4554	Ice-Cream	Informal	Fat content only 4·8 per cent. Should be not less than 5·0 per cent.	Vendor interviewed.
N.3155	Gravy Browning	Informal	List of ingredients in wrong order.	Packers agreed to amend labels.
N.3159	Parrish's Chemical Food.	Informal	Contained only 0·35 per cent. w/v Iron and 0·41 per cent. w/v Calcium. B.P.C. limits 0·40 per cent.—0·45 per cent. w/v Iron and 0·50 per cent.—0·58 per cent. w/v Calcium.	No further stock available.
C.4492	Ice Lollies.	Informal	List of ingredients included "Vegetable Butter". Sample contained 3·0 per cent. of fat of which only approximately one-fifth consisted of butter fat.	Packers agreed to alter labels.
C.4593	Beef Sausage.	Informal	Contained 185 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
C.4600	Pork Sausage.	Informal	Meat content only 54 per cent. Contained 470 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration. Maximum permitted in sausages when declared is 450 parts per million.	Poor in meat content. Vendor interviewed and cautioned.
7065.S	Vinegar.	Informal	Unsightly appearance due to deposit.	Manufacturers notified.
E.6100	Tomato Sausage.	Informal	Contained 390 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
E.2769	Part of tin of Corned Beef.	Informal	Contained a fly which weighed 22 milligrams.	Packers cautioned.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
C.4648	Parrish's Chemical Food.	Informal	30 per cent. of the iron present had become insoluble.	No further stock available.
7069.S	Flour.	Informal	Contained creta praeparata 510 milligrams per 100 grammes. Limits are 235–390 milligrams per 100 grammes.	Millers communicated with.
7075.S	Black-currant Jam.	Informal	Contained a piece of elastic self-adhesive bandage which measured $2\frac{5}{8}$ " x $\frac{3}{4}$ " and weighed 0.8 gramme.	Section 2, Food and Drugs Act, 1955. Fined £15 and £7 costs.
E.6107	Pork Sausage Meat.	Informal	Meat content 64.5 per cent.	Very slightly poor in meat content.
E.6140	Pickles, Mixed (2 Jars)	Informal	The two jars together contained six aphides.	Same packers as E.6141.
E.6141	Pickles, Mixed.	Informal	Contained seven minute insects identified as aphides probably derived from the cauliflower.	Packers notified and complainant informed.
E.2770	Part of 2-lb. bag of Sugar.	Informal	Contained two pieces of partly dried cat faeces together weighing $14\frac{1}{2}$ gms.	Section 2, Food and Drugs Act, 1955. Fined £10 and £12.18.0 costs.
N.3255	Rose Hip Syrup.	Informal	Vitamin C content 54.5 milligrams per fl. oz. compared with 57 milligrams per fluid ounce declared.	Manufacturers informed.
E.6190	Sago.	Informal	Consisted of Tapioca.	Vendor notified.
E.6208	Flour.	Informal	Vitamin B ₁ 0.20 mgm/100 gms. (limit not less than 0.24 mgm.) Nicotinic Acid 1.5 mgms./100 gms. (limit not less than 1.6 mgms.)	No action advised.
7122.S	Minced Chicken in Jelly, Bottled.	Informal	Contained only 68.0 per cent. chicken. Should contain not less than 70 per cent. chicken.	Manufacturers notified.
7133.S	Fruit Dried, Raisins.	Informal	Contained live mites and actively growing yeasts.	Stock surrendered.

Table 21—continued.

No. of Sample	Description	Formal Informal or Private	Nature of Adulteration or Irregularity	Observations
E.6242	Headache Powders.	Informal	Carton labelled "Contents Eight Powders" but con- tained six powders only. Weight of powders varied from 0.572 to 0.668 gramme (declared 0.5 gramme).	Packers communi- cated with.
E.6243	Ammoni- ated Tincture of Quinine.	Informal	Ammonia 0.37 per cent. w/v. Deficient of 0.48 per cent. of the minimum amount of ammonia.	Stock withdrawn from sale.
E.6273	Ammoni- ated Tincture of Quinine.	Informal	Ammonia 0.74 per cent. w/v. Deficient of 0.11 per cent. of the minimum amount of ammonia.	Vendor interviewed.
E.6269	Ground Almonds.	Informal	Acid value of extracted oil 5.0. No objectionable flavour.	No action advised.
E.6272	Headache Powders.	Informal	List of ingredients on label adds up to 100.1 per cent. Otherwise genuine.	See also sample No. N.3450 and C.5294. Packers notified.
E.6268	Ammoni- ated Tincture of Quinine.	Informal	Ammonia 0.45 per cent. w/v. Deficient of 0.40 per cent. of the minimum amount of ammonia.	Stock withdrawn from sale.
E.5906	Fruit Dried, Sultanas	Informal	Contained four live larvae of Cocoa Moth (<i>Ephestia</i> <i>Elutella</i>).	Stock surrendered and destroyed.
E.5912	Opened tin of Liver Salts.	Informal	Contained 90 pieces of tin- ned copper wire (36 S.W.G.) varying in length from 2 up to 11 millimetres and weigh- ing in all 0.105 gramme.	Packers communi- cated with.
7216.S	Fruit, Dried (Mixture).	Informal	No list of ingredients dis- played on label.	Packers communi- cated with.
C.4886	Cascara Liquid.	Informal	Sample consisted of Cascara Liquid extract which had evaporated with loss of alcohol and formation of deposit.	Stock surrendered and destroyed.
C.5001	Bread (part sliced loaf)	Informal	Contained five narrow strips of zinc oxide adhesive plaster with attached cotton dressing weighing in all 1.13 grammes.	Section 2, Food and Drugs Act, 1955. Fined £5 and £7 costs.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
N.3450	Headache Powders.	Informal	List of ingredients on label adds up to 100·1 per cent. Otherwise genuine.	See also sample No. E.6272 and C.5294.
N.3453	Fruit, Dried (Mixture).	Informal	No list of ingredients displayed on label.	Packers communicated with.
E.6364	Portion of Chocolate Sponge Sandwich	Informal	Contained 0·59 gramme of material of the nature of a dried and hardened mixture of protein and sugars. The protein was of the nature of albumen. Otherwise genuine.	Complainant and bakers interviewed.
C.5039	Pork Sausage.	Informal	Meat content 64 per cent. Contained 285 parts per million sulphite preservative (expressed as sulphur dioxide) without declaration.	Slightly poor in meat content. Vendor interviewed re preservatives.
C.5082	Pork Sausage	Informal	Meat content 57 per cent. Contained 175 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Poor in meat content. Vendor interviewed re preservatives.
E.6459	Skimmed Milk Powder.	Private	Contained dark brown particles of overheated dried milk amounting to 0·07 per cent., otherwise chemically satisfactory.	Purchasing department informed.
E.6481	Orange Drink.	Informal	No name and address of packer on carton.	Packers communicated with.
1	Sliced Tea-cake containing foreign object.	Informal	Contained a dead ground beetle approximately one-inch long and weighing 0·34 gramme.	Complainant and bakery informed.
C.5166	Channel Islands Milk	Informal	Deficient 5 per cent. fat.	Same vendor. Vendor interviewed. Further sample genuine.
C.5167	Channel Islands Milk.	Informal	Deficient 5 per cent. fat.	

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
N.3564	Part of sliced loaf of bread and foreign matter.	Informal	A knot of jute twine containing a pink cardboard eyelet and weighing 1.15 grammes stated to have originally been in the bread, contained fragments of wheat bran and cooked wheat starch similar to the crumb of the bread.	Complainant informed and Bakery communicated with.
E.6527	Beef Sausages.	Informal	Contained 260 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
E.6528	Beef Sausages.	Informal	Contained 75 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
E.6536	Beef Sausages	Informal	Contained 30 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	No action advised.
7469.S	Ground Almonds.	Informal	Acid value of extracted oil 11.7 Sample had a stale flavour.	Stock withdrawn from sale.
C.5200	Potted Beef.	Informal	Meat and Gelatine 65.5 per cent. Appearance of Meat Brawn and should not be sold as potted beef.	Vendor interviewed.
N.3619	Salmon Spread.	Informal	Fish content only 53.5 per cent.	Formal sample advised.
	Sweet	Informal	Contained a darkly coloured stain consisting of iron oxide and traces of vegetable debris.	Manufacturers informed.
E.6555	Pickle, Part-filled jar.	Informal	Contained three small fragments of broken glass weighing in all 8 milligrams.	Section 2, Food and Drugs Act, 1955. Absolute discharge on payment of £7.11.0 costs.
C.5256	Cut Mixed Peel.	Informal	Contained 1.9 per cent. salt without declaration in list of ingredients.	Packers agreed to alter label.

Table 21.—continued.

No. of Sample	Description	Formal Informal or Private	Nature of Adulteration or Irregularity	Observations
C.5300	Ammoni- ated Tincture of Quinine B.P.C.	Informal	Ammonia 0·80 per cent. w/v B.P.C. limits 0·85–1·05 per cent. w/v.	No action advised.
C.5294	Headache Powders.	Informal	Declared list of ingredients totals 100·1 per cent. Otherwise genuine.	See also samples E.6272 and N.3450.
N.3698	Dripping.	Informal.	Contained 2·7 per cent. free fatty acids. Should not contain more than 1·5 per cent.	Vendor notified.
E.6575	Cut Mixed Peel.	Informal	Contained 0·7 per cent. salt without declaration in list of ingredients.	Packers communi- cated with.
E.6582	Opened part-filled packet of Ginger Nut Biscuits.	Informal	One biscuit contained a piece of thin cardboard or thick paper weighing 0·52 gramme.	Packers communi- cated with.
E.6588	Mixed Peel.	Informal	Contained 0·35 per cent. salt without declaration in list of ingredients.	Importers notified.
E.6589	Flour Confection- ery (Parkin.)	Informal	Contained 47 per cent. oat- meal and only 1·5 per cent. butter. These ingredients should be first and last res- pectively in voluntary list of ingredients.	Bakers communi- cated with.
E.6620	Pork Sausage	Informal	Meat content 46 per cent.	Poor in meat con- tent. Vendor interviewed.
N.3734	Margarine.	Informal	Vitamin A content only 735 I.U's. per ounce. Limits 760–940 I.U's. per ounce.	No action advised.
E.6629	Bread (with piece of glass submitted separately).	Informal	Bread contained no glass. Buttered portion contained small fragment of broken glass weighing 0·5 mgm.	Complainant informed.

THE LABELLING OF FOOD ORDER

The first Labelling of Food Order was made in the year 1944, but it has been amended or re-enacted on several occasions since that time. The Order at present in force is the Labelling of Food Order, 1953, which came into operation on the 5th April of that year and which has been kept in force by the Twelfth Schedule of the Food and Drugs Act, 1955. Four amending Orders to the Labelling of Food Order, 1953, were made in the years 1953, 1955, 1958 and 1959. No further amending Orders were made in the year under review.

During the year under review, 47 samples (28 County and 19 from Autonomous Authorities) were found to contravene the requirements of the Labelling of Food Order. Brief details of the 28 County samples will be found in table 21. Of the total number of samples to which exception was taken 28 (16 County) had labels which did not disclose one or more of the following requirements; the name and address of the packer, the true name of the food or a correct list of ingredients. In each of the above instances, the packers were communicated with and their attention drawn to the requirements of the Order. During the previous year, 1959, the number of samples which contravened the Labelling of Food Order included 36 County samples and 25 from Autonomous Food and Drugs Authorities. In addition, five samples (3 County) submitted during 1960 bore no declaration of the net weight and these were brought to the attention of the Weights and Measures Inspectors concerned.

In the following paragraphs reference is made to a number of the more interesting samples, in relation to their labels, submitted by County Sampling Officers and by Autonomous Food and Drugs Authorities.

Margarine, Samples No's. N.3734, 447 and 725

All margarine sold by retail is required by the Food Standards (Margarine) Order, 1954 to contain between 760 to 940 international units of Vitamin A and from 80 to 100 I.U's. of Vitamin D per ounce respectively. The Vitamin A content prescribed is equivalent to the average Vitamin A content of butter. Part VI of the Labelling of Food Order, 1953 also requires that when general claims are made as to the presence of vitamins in foods the minimum quantity of each vitamin present per ounce shall be declared on the labels or advertisements. During the year under review 15 samples of margarine (7 County) were examined for their Vitamin A contents. The three samples mentioned above gave results which were outside the limits prescribed. Sample

No. N.3734 (County) was found to contain 735 I.U's of Vitamin A per ounce and Sample No. 725 (submitted by an Autonomous Food and Drugs Authority) contained 720 I.U's. of Vitamin A per ounce. In view of the relatively slight discrepancies found in respect of these two samples no further action was advised. The remaining sample No. 447, (also submitted by an Autonomous Food and Drugs Authority), was found to contain 1035 I.U's. Vitamin A per ounce and its moisture content was 16·4 per cent., i.e., slightly in excess of the maximum limit of 16 per cent. water prescribed by the Food Standards (Butter and Margarine) Regulations, 1955. The manufacturers concerned were communicated with in respect of both the discrepancies found in this last mentioned sample.

Rose Hip Syrup, Samples No's. C. 3962, N.3255 and 220/60

Three samples only were submitted during the year under review and they all showed minor discrepancies, either in the manner of declaration of the Vitamin C content or in respect of the amount of Vitamin C present. Informal sample No. C.3962 bore a declaration that it contained 200 milligrams of Vitamin C per 100 ml. The Vitamin C content found was satisfactory but the declaration is required, by Article 9 and Part I of the Second Schedule of the Labelling of Food Order, to be in terms of milligrams of Vitamin C per fluid ounce and not per 100 ml. It transpired that this was old stock and that correct labels were already in use. The remaining two samples were both of the same brand of rose hip syrup (but of different manufacture to the first mentioned sample). One sample was submitted by a County Sampling Officer, the other being submitted by an Autonomous Food and Drugs Authority. The form of declaration was correct, viz., 57 milligrams of Vitamin C per fluid ounce, but upon examination sample No. N.3255 was found to contain only 54·5 milligrams of Vitamin C per fluid ounce, while sample No. 220/60 contained only 50 milligrams per fluid ounce. In both instances the manufacturers were communicated with in regard to the discrepancies found.

Tonic Wine, Sample No. 408

This informal sample, submitted by an Autonomous Food and Drugs Authority, was an imported wine and bore the declaration "Strength N.E. 27°." Upon examination it was found to contain 23·5 per cent. Proof Spirit and 1·9 grains of quinine per pint. The declaration of alcoholic strength was not in the form prescribed by Part II of the Labelling of Food Order and the result of the analysis appeared to disclose a deficiency in Proof Spirit. It transpired, however, that the letters "N.E." in the form of declaration used referred to the

expression "not exceeding," the declaration was made solely for Customs and Excise purposes for determination of the amount of duty on import, it had no bearing on the requirements of the Labelling of Food Order. Furthermore, Part V, Article 8(g) of the Order also requires that where toxic properties are claimed for a liquor, it must contain a substance or substances other than alcohol in sufficient quantity to confer such properties and the appropriate percentages of each such substance present must be stated on the label. In this particular instance no reference whatsoever was made on the label to the presence of quinine. The packers concerned were cautioned and they agreed to amend the label.

Creamed Rice with Sultanas, canned. Samples No's. C.3828 and C.3869

The first of these two samples was submitted by a County Sampling Officer, it was found upon examination to contain milk, rice and sugar, but it was entirely devoid of sultanas. This was an imported product and two further cans were obtained from the same stock ; one of these contained sultanas in addition to the other ingredients and was reported as genuine but the other, No. C.3869, was, like the first sample, devoid of sultanas. The stock in question was withdrawn from sale.

Lard, Sample No. N.2547

This informal sample of prepacked imported lard bore a declaration that it contained 100 parts per million of butylated hydroxytoluene. This substance is one of the antioxidants permitted in certain specified foods, including anhydrous edible fats. The Antioxidant in Food Regulations, 1958, do not require the declaration of the presence of an antioxidant in a specified food sold by retail but, if a voluntary declaration is made, your Analyst is of the opinion that it should be a correct declaration. Upon examination the sample in question was found to contain 70 parts per million of Butylated Hydroxyanisole (another permitted antioxidant) and a smaller amount, of the order of 30 parts per million, of Butylated Hydroxytoluene. The packers were communicated with and it transpired that lard from this source originally contained only Butylated Hydroxytoluene, but later supplies contained a mixture of both antioxidants to lengthen the shelf life of the product; the use of a mixture of these two antioxidants is permitted under the regulations. The packers also stated that at the time the wrappers were obtained they understood erroneously that a declaration was necessary, but later they realised this was not so. They had, however, continued to use up the original wrappers although the precise nature of the antioxidant used had been altered. In view of this explanation no further action was taken in this matter.

Ice Lollies, Sample No. N.3003

These informal prepacked ice lollies bore a name which included the word "Cremey" and the first ingredient declared in the list of ingredients was ice-cream. Upon examination the sample was found to be entirely devoid of milk-fat although the total fat content was 4·2 per cent. The Labelling of Food (Amendment) Regulations, 1959, which relate to the labelling of ice-cream, prohibit its labelling in a manner suggestive of butter, cream, milk or anything connected with the dairy interest unless the ice-cream contains no fat other than milk-fat. This provision also applies in relation to ice-cream which forms part of a composite article of food. The manufacturers of the lollies were communicated with and at first they replied that the name in question had been in use for many years and it did not imply that real cream was present. On it being pointed out, however, that these were relatively new regulations and that it was not solely the use of the word "Cremey" which infringed the new labelling requirements but the use of this word in conjunction with ice-cream, the packers agreed to amend their label.

Ice-Cream, Sample No. 6824.S

This informal sample of prepacked ice-cream was found upon analysis to contain 11·5 per cent. of edible fat but the amount of milk-fat present was only of the order of one per cent. of the sample. The Labelling of Food (Amendment) Regulations, 1959, have required, since 30th November, 1959, that all prepacked ice-cream which contains fat other than milk-fat shall bear on the label the declaration "contains non-milk-fat" or "contains vegetable fat" which ever is appropriate. No such declaration was made in respect of this sample. The manufacturers were cautioned in respect of the omission from the label and they stated they were no longer making this type of ice-cream.

Flour Confectionery—Parkin, Sample No. E.6589

This informal sample of prepacked parkin bore a declaration on the label stating "containing Cane Syrup, Sugar, Oatmeal, Butter, Edible fat, etc." Upon examination the sample was found to contain : Oatmeal 47·5 per cent., Cane Syrup 31·5 per cent., Sugar 11·0 per cent., Edible fat 7·5 per cent., butter 1·5 per cent. Prepacked flour confectionery is exempted by the First Schedule, Table B, of the Labelling of Food Order from the necessity to comply with Part II of the Order, including the necessity to specify a list of ingredients. Where, however, a voluntary list of ingredients is given on a label, your Analyst considers that it should be a correct list given in the correct order, i.e., the ingredient used in the greatest proportion being specified first, etc.

The list of ingredients given in respect of this sample was clearly not in the correct order (which should be that of the order in which the analysis is stated) ; in particular, oatmeal should be declared first and butter last. The bakers concerned were communicated with and they agreed to amend the order of the list of ingredients on the label.

Apple Juice (canned), Sample No. 115/60

This informal sample of imported canned apple juice submitted by an Autonomous Food and Drugs Authority bore a label which included the declaration "contains not less than 35 milligrammes of Vitamin C per 100 cc." This declaration is not in the form specified by the Labelling of Food Order which requires the minimum quantity of Vitamin C in milligrams per fluid ounce to be declared. The form of declaration given, however, satisfied the labelling requirements of the Country of origin. In addition, upon analysis the Vitamin C content was found to be somewhat deficient, being 29·8 milligrams per 100 cc. instead of 35 milligrams. The firm concerned were communicated with on these two points and they took the matter up with the importers who, in turn, referred it to the overseas packers. The latter agreed to amend the label to satisfy the requirements of the United Kingdom as well as the country of origin by adding the words "or 10 milligrams per fluid ounce ;" furthermore, they stated that everything was being done to maintain a satisfactory Vitamin C content in the product and to that end it was their practice to have the initial Vitamin C content over 45 milligrams per 100 cc. in order to minimise any loss on storage, etc.

Dextrose with Essence of Fresh Fruit, Sample No. 493

This informal sample of a prepacked commodity in powder form, sold under a proprietary name, was submitted by an Autonomous Food and Drugs Authority. The sample bore a declaration of the list of ingredients which stated "Dextrose 50%, Sugar, Citric Acid, Soda Bicarb., Essential Citrus Oils, Saccharin, Quillaia and colour." Upon analysis the ingredients were found to include 43·7 per cent. anhydrous dextrose (equivalent to not more than 48·6 per cent. dextrose monohydrate), 23·7 per cent. sucrose, 17·4 per cent. citric acid and 9·4 per cent. sodium bicarbonate. It was considered that the description applied to this product, i.e., "dextrose with essence of fresh fruit," was misleading, in that the dextrose content was not more than 50 per cent. and particularly the use of the term "with essence of fresh fruit" having regard to the nature of the other ingredients present, several of which were neither found in, nor derived from, fresh fruit. The packers were communicated with and they eventually agreed to

describe the product as “—————”, containing dextrose flavoured with essential citrus oils ” and, of course, still including a full list of the ingredients on the label.

ICE-CREAM

Until November, 1948, there was no control in this country on the composition of ice-cream. In that month, however, the Ministry of Food decided to allocate additional supplies of sugar, and in some cases fats, to those manufacturers who undertook to include at least 2·5 per cent. fat in their ice-cream. In March, 1951, the first Statutory Standard for ice-cream was made and, except for a short period between July, 1952, and June, 1953, when a slightly reduced standard was temporarily introduced, the minimum standard then laid down was in operation until April, 1959. This standard required ice-cream to contain not less than 5 per cent. fat, 10 per cent. sugar and $7\frac{1}{2}$ per cent. milk solids other than fat. There were special standards for ice-cream containing fruit and for “ Parev ” (kosher) ice. The required sugar content of ice-cream could be made up of certain other sugars in addition to sucrose but no ice-cream was permitted to contain less than $7\frac{1}{2}$ per cent. sucrose.

When the above standard was first introduced in the year 1951 the Food Standards Committee of the Ministry of Food stated that it was not an ideal standard and that it should be amended and improved as supplies of ingredients became more plentiful. It was not surprising, therefore, that a Food Standards Committee report on the ice-cream standard was published in December, 1957, and that this should be followed by the making of the Food Standards (Ice-Cream) Regulations, 1959, which came into operation on the 27th April, 1959. The new standard incorporated in these regulations is as follows and applies whether or not the ice-cream forms part of a composite article of food :—

“ (a) Ice-Cream shall contain not less than 5 per cent. fat and $7\frac{1}{2}$ per cent. milk solids other than fat so, however, that where ice-cream contains any fruit, fruit pulp or fruit purée it shall either conform to the above standard or, alternatively, the total content of fat and milk solids other than fat shall be not less than $12\frac{1}{2}$ per cent. of the whole including the fruit, fruit pulp or fruit purée, as the case may be, and such total content of fat and milk solids other than fat shall include not less than $7\frac{1}{2}$ per cent. fat and 2 per cent. milk solids other than fat ;

Provided that as respects any ice-cream sold, or offered or exposed for sale under any of the descriptions hereinafter specified, or under any such other description as is calculated to lead an intending purchaser to believe that he is purchasing ice-cream of

any such description as is so specified, the standard of composition shall be as follows :—

(i) Dairy ice-cream, dairy cream ice or cream ice shall in each case contain not less than 5 per cent. milk fat and no other fat (save as may be introduced by the use as an ingredient of any egg, any flavouring substance or any emulsifying or stabilising agent) and not less than $7\frac{1}{2}$ per cent. milk solids other than fat, so, however, that where any dairy ice-cream, dairy cream ice or cream ice contains any fruit, fruit pulp or fruit purée it shall either conform to the standard of composition for that ice-cream or, alternatively, the total content of milk-fat and milk solids other than fat shall be not less than $12\frac{1}{2}$ per cent. of the whole including the fruit, fruit pulp or fruit purée, as the case may be, and such total content of milk-fat and milk solids other than fat shall include not less than $7\frac{1}{2}$ per cent. milk-fat and no other fat (save as may be introduced by the use as an ingredient of any egg, any flavouring substance or any emulsifying or stabilising agent) and not less than 2 per cent. milk solids other than fat.

(ii) Milk ice or milk ice containing any fruit, fruit pulp or fruit purée shall contain not less than $2\frac{1}{2}$ per cent. milk-fat and no other fat (save as may be introduced by the use as an ingredient of any egg, any flavouring substance or any emulsifying or stabilising agent) and not less than 7 per cent. milk solids other than fat.

(iii) “ Parev ” (kosher) ice shall contain not less than 10 per cent. fat and no milk-fat or other derivative of milk.

(b) No ice-cream of any description shall contain any artificial sweetener.

In this Schedule —

(a) ‘ artificial sweetener ’ means any chemical compound which is sweet to the taste, and the expression includes polyhydric alcohols but does not include sugar or any other carbohydrate

(b) each reference to any proportion or percentage means that proportion or percentage by weight.”

It will be noted that there is now no minimum standard for sugar content but there is a specific prohibition in the use of artificial sweeteners. The most important change is, however, the introduction of the special standards for dairy ice-cream, dairy cream ice, cream ice

and milk ice which are all now required to contain specified minimum amounts of milk-fat, the use of other types of fat not being permitted in these varieties of ice-cream.

On the same day that this standard came into operation an amendment to the Labelling of Food Order also came into force and this introduced requirements as to the labelling of ice-cream. It is now illegal to label or advertise ice-cream by means of words or pictorial devices suggestive of butter, cream, milk or anything connected with the dairy interest unless the ice-cream contains no fat other than milk-fat. The label or advertisement may, however, bear a statement to the effect that the ice-cream contains skimmed milk solids. It is now also an offence to sell under the description "ice-cream" any prepacked ice-cream which contains fat other than milk-fat unless the wrapper also bears in letters of a specified height either the declaration "contains non-milk-fat" or, if appropriate, the declaration "contains vegetable fat." The above requirements also apply to ice-cream which forms part of a composite article of food.

A third regulation concerning both ice-cream and certain types of ice lollies also came into operation on the 27th April, 1959, i.e., the Ice-Cream (Heat Treatment, etc.) Regulations, 1959. These regulations consolidate and amend the Ice-Cream (Heat Treatment) Regulations, 1947 to 1952. The new regulations require the ingredients of ice-cream after mixing to be either pasteurised or sterilised by one or other of the following methods :—

Pasteurisation

"Method I. The mixture shall be raised to and kept at a temperature of not less than 150° Fahrenheit for at least 30 minutes.

Method II. The mixture shall be raised to and kept at a temperature of not less than 160° Fahrenheit for at least 10 minutes.

Method III. The mixture shall be raised to and kept at a temperature of not less than 175° Fahrenheit for at least 15 seconds.

Sterilisation

The mixture shall be raised to and kept at a temperature of not less than 300° Fahrenheit for at least 2 seconds.

Before heat treatment the mixture shall not be kept for more than one hour at any temperature which exceeds 45°F and after heat-treatment it shall be cooled to not more than 45°F within 1½ hours and kept at this temperature until the freezing process is carried out. After freezing the ice-cream shall be kept at a temperature not exceeding

28°F ; if its temperature does exceed this figure it must again be heat-treated before being re-frozen.

The above requirements as to pasteurisation or sterilisation do not apply to the use of a complete cold mix reconstituted with drinking water if the mixture is made into ice-cream within one hour of reconstitution. The requirements also do not apply to any mixture (whether containing milk solids or not) used, either alone or with other mixtures in the manufacture of water ice or similar products if the mixture has a pH value of 4·5 or less. It is considered that such products are sufficiently acid to prevent the growth of harmful bacteria without heat-treatment.

It will be noted from table 22, that the average fat content of ice-cream during the year under review is 8·7 per cent. and is only very slightly below the figure recorded for the previous year so that the general improvement in the fat content of ice-cream found over the last 12 years, is still maintained. A perusal of the table shows that the average fat content in 1946 was only 2·3 per cent. whereas for 1960 it was 8·7 per cent. Furthermore, the lowest fat content found during 1960 was 4·1 per cent. ; whereas in the four years 1946 to 1949 fats as low as 0·3 and even 0·1 per cent. were found. Table 22 shows the results for all samples of ice-cream examined in the County Laboratory whether submitted by County Sampling Officers or by Autonomous Food and Drugs Authorities.

During the year, 1960, 68 samples of ice-cream (excluding samples of dairy ice-cream) were submitted for chemical analysis, 22 by County Sampling Officers and 46 by Autonomous Food and Drugs Authorities. Of these, seven samples (two County) were reported upon adversely, five of which did not comply with the Food Standards (Ice-Cream) Order. In the year, 1959, four samples were reported upon adversely. Of the two unsatisfactory County samples, one was slightly deficient in fat and one did not bear the required declaration " Contains non-milk-fat." Details of the incorrect County samples together with the action taken will be found in table 21. It is interesting to note that one of the samples received from an Autonomous Authority was reported upon adversely in that it was found to have a gritty texture owing to separation of lactose, due to high milk solids-other-than-fat and high total solids. The sample was otherwise genuine. The makers were interviewed and given advice with regard to the manufacture.

The average figures found for the 68 samples were—total solids 35·4 per cent. (maximum 50·7 ; minimum 25·8) and for fat content 8·7 per cent. (maximum 12·4 ; minimum 4·1). These figures as will be seen from the following table, which includes figures for the last 15 years,

show that the big improvement in composition noted in the year 1950 has been maintained. It will be remembered that prior to the war a figure of eight per cent. was suggested by a trade association as a minimum standard for fat content and it is interesting to note that during the year under review, 42 samples out of the total of 68 showed fat contents varying from 8.1 to 12.4 per cent.

Table 22

Ice-Cream

YEAR	Number of Samples	Fat Content Average %	Total Solids Average %	Highest Fat %	Lowest Fat %	Highest Total Solids %	Lowest Total Solids %
1946	45	2.3	22.5	10.7	0.1	36.8	13.3
1947	59	3.0	23.6	10.6	Less than 0.1	39.2	14.1
1948	53	3.9	25.3	11.3	0.1	33.4	18.9
1949	171	6.4	29.3	13.3	0.3	45.9	14.7
1950	186	8.5	32.1	14.7	2.2	43.0	20.1
1951	230	8.6	32.6	15.6	3.3	40.7	23.0
1952	143	9.0	32.8	13.7	2.0	40.0	19.6
1953	130	8.6	32.7	15.2	2.5	42.3	23.3
1954	90	9.2	34.6	13.8	3.1	44.0	24.8
1955	95	8.1	33.2	13.3	3.5	40.9	24.3
1956	94	9.2	34.0	16.4	3.6	43.6	26.3
1957	99	8.7	33.3	14.7	3.0	41.9	22.9
1958	111	8.9	33.8	15.6	2.7	42.1	25.3
1959	104	8.9	34.6	17.4	4.6	55.2	27.4
1960	68	8.7	35.4	12.4	4.1	50.7	25.8

Dairy Ice-Cream

Eight samples (two County) of dairy ice-cream, not included in the foregoing table, were also submitted for chemical analysis. The average figures found for the eight samples were—total solids 35.9 per cent. (maximum 41.0 ; minimum 30.2) and for milk-fat content 10.1 per cent. (maximum 13.1 ; minimum 6.6). All the samples were found to be satisfactory.

Milk Ice

No samples of Milk Ice were submitted during the year under review.

ICE LOLLIES

During the year under review 14 samples of ice lollies were submitted for examination under the Food and Drugs Act. Eight of the samples were submitted by County Sampling Officers, and six samples by Autonomous Food and Drugs Authorities. Unlike ice-cream there is no statutory standard for the composition of ice lollies. They are specifically excluded from the provisions of the Food Standards (Ice-Cream) Order while the Food Standards (Soft Drinks) Order refers only to liquid soft drinks although ice lollies are, in general, similar in composition to soft drinks. Ice lollies and ice-cream are, however, both mentioned in the revised report on lead of the Food Standards Committee of the Ministry of Food and in the Arsenic in Food Regulations which were published in the years 1954 and 1959 respectively. In these, maximum limits of only one part per million for lead and 0·5 part per million for arsenic (as As) are recommended or specified for both commodities. The limits for the majority of other foods are two parts per million and one part per million respectively. In addition to the special limits for lead and arsenic referred to above there are also recommended maximum limits for two other toxic metals in foods generally, *viz*, copper 20 parts per million and zinc 50 parts per million. In view of the more stringent figures adopted for lead and arsenic in ice lollies than in foods generally, lower limits for copper and zinc may also be desirable for this particular type of commodity. Of the 14 samples of ice lollies, four County samples were reported upon adversely. These four samples all had unsatisfactory labels. Details of the incorrect samples together with the action taken will be found in table 21.

The total solids (sugars, etc.) in the samples ranged from as little as 3·1 per cent. to 32·3 per cent. with an average for the 14 samples of 14·6 per cent. The average total solids for the 46 samples examined in the previous year was 15·5 per cent.

SAUSAGE, MEAT PASTE AND FISH PASTE

On the 1st March, 1953, the last of the Meat Products Orders was revoked and this had the effect of removing all restrictions, for control purposes, on the price and composition of both pork and beef sausages. It should be noted, however, that the Orders mentioned above were made by the Minister of Food for the purpose of controlling the sale of certain commodities which were, or had been, in short supply. In view of the

increased supplies of meat which have been available since February, 1953, it would appear reasonable to expect that sausages should now have at least the same meat content as in the days of control and short supply and successful prosecutions were instituted by the County, in the years 1953, 1954 and 1955, following the revocation of the Meat Products Orders, in respect of samples of pork sausages found to be seriously deficient in meat. In these cases taken under Section 3 of the Food and Drugs Act, 1938, the Courts accepted the opinion of your Analyst that genuine pork sausage must contain not less than 65 per cent. of meat.

During the year 1956, however, the position was rendered difficult by the results of two Appeal cases in which the judgments went against the prosecution. In the case of *Marston v. Loney* heard in October, 1955, the standard suggested by the Public Analyst was based on the standard previously fixed under the Meat Products Order which had by then been revoked. No other evidence as to a standard was given. In the other case of *Thrussell v. Whiteman* in January, 1956, the Lord Chief Justice said, "The sooner it is seen that these cases lead to chaos and it is prescribed what a sausage is the better," he also thought that it depended on the price. This last is quite a new concept in deciding whether a particular food is genuine and up to standard so far, at least, as the Food and Drugs Act is concerned. While successful prosecutions have been taken by some Food and Drugs Authorities subsequent to the above Appeal cases there is no doubt that it is now difficult to obtain convictions particularly in the case of sausages which are relatively cheap in price.

The last Meat Products Order, revoked on the 1st March, 1953, in addition to controlling price and meat content, also prohibited the use of certain specified offals in the preparation of sausages and other uncooked open meat products intended for human consumption. The restriction on the use of these offals was, however, re-enacted in the Offals in Meat Products Order, 1953.

The compositions of meat paste and of fish paste are controlled by the Food Standards (Meat Paste) Order, 1951, and the Food Standards (Fish Paste) Order, 1951. The standard for meat paste is a minimum of 55 per cent. meat and for fish paste a minimum of 70 per cent. fish. The standards apply to both imported and home produced products.

During the year 1960, 100 samples of sausages, four of sausage meat, seven of canned sausage, one canned sausage with beans, two tomato, three Cumberland, one liver sausage and one Frankfurter canned were examined as against 84 samples of sausage and 11 samples of canned

sausage, etc., in the previous year. Ninety-one samples were examined for the County (including four sausage meat, six canned, one tomato, one canned with beans, three Cumberland and one liver) and 28 (including one canned, one Frankfurter and one tomato) for Autonomous Food and Drugs Authorities. Of the total number of sausage samples submitted during the year under review 39 consisted of beef (including two sausage meat) and 65 of pork (including two sausage meat). Thirty-two County samples and seven submitted by other Food and Drugs Authorities were reported upon adversely. A perusal of table 21 will show that while eleven of the County samples were poor in meat the deficiencies were not serious in five of these instances. Twenty-three of the samples examined, including 17 County samples, contained normal amounts of sulphite preservative (in addition, one County sample contained a slight excess of sulphite preservative) but without any declaration of the presence of preservative being made on the label or exhibited in the shops concerned. This is contrary to the requirements of the Public Health (Preservatives, etc., in Food) Regulations, 1925 to 1958. Details of all the adulterated County samples together with the action taken, will be found in table 21.

It is interesting to note that the average meat content of 37 samples of beef sausage examined in the County Laboratory during the year 1960 was 60·2 per cent., while the average meat content of 63 samples of pork sausage examined over the same period was 66·5 per cent. Bearing in mind that the standards before the 1st March, 1953, under the Commodity Control Order, were a minimum of 50 per cent. meat for beef sausage and beef sausage meat and a minimum of 65 per cent. meat for pork sausage and pork sausage meat, the average figure obtained in the County Laboratory during the year 1960 for beef sausage is very satisfactory. In fact of 37 samples of beef sausage only one contained less than 50 per cent. meat. With regard to pork sausage the average results are also satisfactory, although there was a slight decrease of 0·9 per cent. on the average figure obtained in the previous year. It will be remembered that the average meat content for 45 samples submitted during the year 1959 was 67·4 per cent. Of the 63 samples of pork sausages submitted during the year 1960, ten (or 16 per cent.) contained less than 65 per cent. meat. Although this cannot be regarded as satisfactory it must be emphasised that it cannot be assumed that the position with regard to pork sausage has deteriorated since control was removed at the beginning of the year 1953. Fifty per cent. of the pork sausage samples submitted in each of the years 1951, 1952 and 1953 were reported upon adversely and the proportions of unsatisfactory samples for the years 1955, 1956, 1957, 1958 and 1959 were 24 per cent., 32 per cent., 26 per cent., 12 per cent. and 20 per cent. respectively.

Seventeen samples of meat paste (nine submitted by County Sampling Officers and eight by Autonomous Authorities) were examined during the year and all were found to be satisfactory.

With regard to fish paste, 28 samples (22 County) were submitted for examination during the year and, of these, two (both County) were reported upon adversely. Informal sample No. E.5094 was found to be deficient of 11·4 per cent. of the minimum percentage of fish. The makers were interviewed and cautioned. A follow-up sample was found to be satisfactory. Informal sample No. N.3619 was found to be deficient of 23·6 per cent. of the minimum percentage of fish. A follow-up sample could not be obtained as the vendor is no longer selling this commodity under its original description of salmon spread.

FLOUR

The Flour Order, 1953, ended the control of flour mills but it stipulated that all flour, except for a few specified exceptions, must contain certain compulsory additives. This Order was enforced centrally, but in 1956 it was revoked. In the same year, however, the Flour (Composition) Regulations came into operation and these have the effect of re-enacting with certain modifications the requirements as to composition contained in the previous Order and they made Food and Drugs Authorities responsible for the enforcement of the Regulations. Apart from certain specified exceptions, all flour (except flour containing the whole of the products derived from the milling of wheat) must now contain Creta Praeparata of a specified fineness in an amount between 235 to 390 milligrams per 100 grammes of flour. In addition, all flour is also required to contain the three other nutrients in the amounts previously prescribed, *i.e.*, Iron not less than 1·65 milligrams per 100 grammes, Vitamin B₁ not less than 0·24 milligrams per 100 grammes and Nicotinic acid or Nicotinamide not less than 1·60 milligrams per 100 grammes. These nutrients must be added (when addition is necessary) in the case of Iron as reduced Iron or ferric ammonium citrate and, in the case of Vitamin B₁, Nicotinic acid and Nicotinamide, in a form conforming to the standards of the B.P. or B.P.C. The Regulations implemented the Government's decision to accept the main conclusions in the report of the Panel on the Composition and Nutritive Value of Flour which was published on the 17th May, 1956, but they only cover the points which have been enumerated above; further Regulations may ultimately be considered necessary. With this in mind the Ministry of Agriculture, Fisheries and Food together with the Ministry of Health and the Department of Health for Scotland published a Press notice on the 7th August, 1956, in which they stated that the Food Standards Committee had been invited to give consideration to

other aspects of the composition of both flour and bread. The Food Standards Committee published its report in November of the year under review and its main recommendations with regard to both flour and bread are mentioned and discussed in the next paragraph.

The Committee considers that the present levels of Creta Praeparata, Iron, Vitamin B₁ and Nicotinic acid as laid down in the Flour (Composition) Regulations, 1956, are satisfactory. In view, however, of the technical difficulties in evenly distributing Creta Praeparata in flour it is recommended that the possible use of other forms of calcium should be investigated ; at the same time further investigation should be made into methods for improving the distribution of creta in flour. The only bleaching agent for use with flour should be benzoyl peroxide in an amount not exceeding 50 parts per million, while maturing agents should be limited to certain specified chemicals. In view of the importance of bread as a staple food the Committee feel that the ingredients permissible in bread, in addition to flour, yeast and water, should be laid down by Regulations. A permitted list of ingredients would of necessity be fairly long and would include such substances as salt, edible fats, milk preparations, sugars, soya flour, gluten, wheat germ, enzyme preparations, yeast stimulating salts, emulsifying agents, preservatives (*i.e.*, propionic acid), acetic acid and phosphates ; in addition, sodium bicarbonate, malt, fruit, nuts or egg should be permitted in certain named breads. The amount of whole milk solids or skimmed milk solids in milk bread is recommended at not less than 3·6 per cent. of the weight of the bread. Originally the report on milk bread published in the year 1959 suggested a minimum of 4·2 per cent., basing this on the now revoked requirement that “ National Milk Bread ” should be made from flour containing 6 per cent. of skim milk powder. The figure of 4·2 per cent. did not, however, allow for the presence of other ingredients besides water, such as salt, yeast and added fat ; the figure of 3·6 per cent. is more realistic having regard to actual bread-making recipes. The Committee also recommend that exaggerated claims for the enrichment of bread or for energy-producing qualities should be prohibited, that claims and descriptions with regard to “ Protein ” breads should be controlled in relation to the actual protein content, that “ slimming ” or weight-reducing properties should not be claimed and that the term “ starch-reduced ” should only be applied to bread if the carbohydrate content on a dry basis is less than 50 per cent. It is recommended that the sampling of flour in order to ascertain that it complies in composition with Regulation requirements should only be carried out at mills and docks where sampling from bulk supplies can be carried out. This recommendation is not surprising in view of the relatively large number of samples from small prepacked bags on retail premises which have been found not to comply with the prescribed limits for creta

praeparata. This is, of course, due to the fact that creta is not free-running and it is almost impossible to distribute it evenly throughout the bulk of the flour. If, however, the Committee's recommendation with regard to further investigations into other methods of distribution of creta and the use of other sources of calcium results in a more satisfactory method of introducing calcium into flour then there should be no difficulty in effectively sampling flour however small the quantity involved. One suggestion made with regard to enforcement is that the work might be removed from Food and Drugs Authorities and placed under some central inspectorate under the control of the Minister and that analyses could be carried out at a central laboratory such as that of the Government Chemist. This suggestion is tantamount to restoring the position which existed prior to the year 1956 when enforcement was under Government control. It suffers from at least one drawback in that the protection afforded to a miller by a divided sample taken under the Food and Drugs Act and the ultimate examination, in case of dispute, of the third portion by the Government Chemist might not be possible. As far as analysis under the Food and Drugs Act is concerned there should be no difficulty in that most Public Analysts have had experience of testing samples of flour for added nutrients since the year 1956 and should any Public Analyst feel he is unable to carry out an effective analysis there is provision under Section 92 (4) of the Act for him to submit it to another Public Analyst.

During the year under review 30 samples of plain flour (20 County) were submitted for examination. In addition, 21 samples of self-raising flour (15 County) and six from Autonomous Authorities were also examined.

Of the 30 samples of plain flour, five samples (four County) were reported upon adversely. Three samples contained more creta praeparata than the maximum limit prescribed in the Regulations while the other two unsatisfactory samples were both slightly deficient in Vitamin B₁ and Nicotinic acid. Informal sample No. E.4465 was found to contain 490 milligrams of creta per 100 grammes of flour as compared with the limits prescribed of from 235 to 390 milligrams. The millers concerned were communicated with. Sample No. 7069.S was found to contain 510 milligrammes of creta per 100 grammes of flour, here again the millers were informed of the result obtained on the examination of this sample. The third sample, No. 3703, which contained excess creta was submitted by an Autonomous Food and Drugs Authority ; this sample was found to contain 550 milligrams of creta per 100 grammes flour and the millers were informed. Sample No. 5603.S was found to contain 0.21 milligrams of Vitamin B₁ per 100 grammes flour and 1.5 milligrams of nicotinic acid per 100 grammes

flour. While sample No. E.6208 was found to contain 0.20 milligram of Vitamin B₁ and 1.5 milligrams of nicotinic acid. The results on both these last-mentioned samples were only slightly below the minimum limits prescribed, *viz.*, 0.24 milligram Vitamin B₁ and 1.6 milligrams nicotinic acid, each per 100 grammes flour; no further action was advised in respect of either of these samples.

Self-raising flour is required, under the Food Standards (Self-Raising Flour) Order, 1946, to yield not less than 0.40 per cent. of available carbon dioxide and it is interesting to note that the 21 samples examined during the year 1960 all complied with this standard. Eight of the 15 County samples of self-raising flour were also examined for their fluorine content and were all found to be satisfactory. The Fluorine in Food Regulations, 1959, which came into operation on the 14th March 1960, prescribe a maximum limit of three parts per million for the fluorine content of self-raising flour.

FISH (CANNED OR BOTTLED)

During the year under review, 63 samples were submitted under the above heading, 51 by County Sampling Officers and the remainder by Autonomous Authorities. Four samples, all County, were reported upon adversely. The number of samples of each variety of fish submitted included :—Salmon 15, Sardines 19, Brisling 4, Sild 5, Anchovies 1, Herrings 5, Pilchards 4, Tuna 6, Mackerel 1, Crab 2 and Cockles 1. A brief account of the four unsatisfactory samples is given in the following paragraphs.

Canned Sild, Samples No's. 5993.S and 6038.S

Both these informal samples consisted of the same brand of canned sild packed in small (1½-oz.) cans. The first sample was found upon examination to contain 370 parts of tin per million parts of the sample. The recommended maximum limit for tin in canned foods is 250 parts per million. A further informal sample (No. 6038.S) of three similar cans from the same stock was obtained and this yielded 370, 405 and 400 parts per million of tin in the contents of the three cans examined separately. In view of the results obtained on all four cans the retailer's stock was withdrawn from sale and the packers were communicated with.

Canned Salmon, Sample No's. E.5307 and E.5329

The first of these informal samples consisted of two cans which were submitted on complaint of taint. The contents of both cans were found to have a taste resembling that of mineral oil, but no odour of mineral oil was apparent. The mixed contents of the two cans yielded

mineral oil (saturated hydrocarbons) to the extent of 125 parts per million parts of the sample. In view of this unsatisfactory result a further sample was requested from the same consignment and this, No. E.5329, consisted of four cans. The contents of each of these cans were examined separately; two had a strong taint of mineral oil (noticeable both by odour and taste) and these yielded 310 and 255 parts per million of mineral oil respectively. The other two cans were similar to the first sample submitted and only showed evidence of taint on tasting; these yielded 140 and 70 parts per million of mineral oil respectively. The results of the examination of these two samples was brought to the notice of the local authority concerned who communicated with the wholesale firm responsible for distributing this commodity. The latter, in turn, approached the importers, who admitted that they had had other complaints and they agreed to withdraw the whole of the consignment.

TOMATO PASTE OR PURÉE

Concentrated tomato paste or purée is obtained by pulping ripe tomatoes. After removing skins, seeds and cores the remaining juice and pulp is rapidly evaporated to a product which represents a double, triple or even a greater degree of concentration of the original material.

During the year under review seven samples of canned concentrated tomato paste were submitted by a County Sampling Officer. They represented four different brands, all imported from the same country, all sold by one retailer and supplied by one wholesaler. Six of the samples, representing three different brands, were packed in small, $2\frac{1}{2}$ -oz, tins and they were all found to be unsatisfactory from the point of view of metallic contamination. The remaining sample was packed in a 14 ounce can with a lacquered interior and this was satisfactory. The total solids contents of all seven samples ranged from 25.2 per cent. to 28.3 per cent., representing approximately triple concentrated products. A brief account of the unsatisfactory samples is given below.

Canned Concentrated Tomato Paste, Sample No's. E.5304 and E.5330

The first of these informal samples represented one $2\frac{1}{2}$ -oz. can, the contents of which were found to contain lead to the extent of 12 parts per million. A further sample, No. E.5330 was obtained from the same stock and this, which consisted of two cans, was found to contain 16.7 parts per million lead in one can and 3.3 parts per million lead in the other. The interiors of all the cans were lacquered but this was lifting over the seam. Small beads of solder, some of which were loose, were clearly visible in the interiors of the cans on and near the seam. The

recommended maximum limit for lead in tomato purée (of 25 per cent. or more total solids content) is 5 parts per million. The remainder of the stock of this brand was withdrawn from sale and the wholesale suppliers informed of the results of the examination of these two samples.

Canned Concentrated Tomato Paste, Sample No's. E.5396 and E.5531

These represent informal samples of another brand of tomato paste obtained from the same shop as the previously mentioned samples. Sample No. E.5396 consisted of two cans, the seams appeared to be sound but the interior unlacquered surface of the tinplate was etched. Upon examining the tomato paste the lead content was found to be within the recommended limit but the contents of one can contained 190 parts per million of tin while the contents of the other can contained 500 parts per million of tin. The recommended maximum limit for tin in canned foods is 250 parts per million. A further sample, No. E.5531, was obtained from the same stock. This also consisted of two cans; the contents of both cans were mixed together and the tin content was found to be 575 parts per million. No further stock was available of this brand.

Canned Concentrated Tomato Paste, Sample No's. E.5532 and E.5581

These informal samples each represent four 2½-oz. cans of yet another brand of imported tomato paste in unlacquered cans. The lead content was found to be within the recommended limit, but the average tin content of the tomato paste in the four cans representing sample No. E.5532 was 460 parts per million. The contents of the four cans in the further sample, No. E.5581, of this brand were examined separately and they yielded 370, 370, 500 and 600 parts per million of tin respectively. In view of these unsatisfactory results the remaining stock of this brand was also withdrawn from sale.

COD-LIVER OIL, MALT EXTRACT, MALT EXTRACT WITH COD-LIVER OIL AND EMULSION OF COD-LIVER OIL.

The first three of the above-mentioned commodities are the subject of monographs in the British Pharmacopoeia, 1958. Emulsion of Cod-Liver Oil was deleted from the B.P. 1958, but is the subject of a monograph in the British Pharmaceutical Codex, 1959. With regard to standards, the British Pharmacopoeia requires Cod-Liver Oil to contain not less than 600 Units of Vitamin A activity per gramme and not less than 85 Units of Antirachitic activity (Vitamin D) per gramme. The assay of Vitamin A activity is carried out by a spectrophotometric method while the Vitamin D is determined by biological assay. Malt Extract of the B.P. is required to contain nitrogen equivalent to 4.0 per cent. w/w of protein and to pass a limit test for Lipase. Malt Extract with Cod-Liver Oil must contain 10.0 per cent. w/w of Cod-

Liver Oil (limits 9·3 to 10·7 per cent.) and must contain not less than 60 units of Vitamin A activity in 1 gramme. It should be noted that while the maximum limit for the acid value of Cod-Liver Oil, per se, is 1·2, the limit for the acid value of the oil obtained in the assay of Malt Extract with Cod-Liver Oil is 10. Emulsion of Cod-Liver Oil B.P.C. is required to contain 50 per cent. (limits 47·5 to 52·5 per cent.) v/v of Cod-Liver Oil but there are numerous proprietary emulsions on the market containing Cod-Liver Oil and other ingredients in varying declared amounts.

During the year under review, eleven samples of Cod-Liver Oil, one sample of Malt Extract, one sample of Malt Extract with added vitamins and minerals, eleven samples of Malt Extract with Cod-Liver Oil, and one sample of a proprietary brand of Cod-Liver Oil Emulsion were submitted for examination. With the exception of the sample of Malt Extract with added vitamins and minerals and one sample of Malt Extract with Cod-Liver Oil, all the samples were submitted by County Sampling Officers.

Only one sample was reported upon adversely. Cod-Liver Oil, informal sample No. C.4496, was found upon examination to contain only 350 units of Vitamin A activity per gramme (as compared with the B.P. minimum limit of 600 units) and to have an acid value of 1·6 (as compared with the B.P. maximum limit of 1·2). There were indications that the sample was old stock in that it had a deeper colour than usual and there was some gumming of the oil round the neck of the bottle. Upon enquiry it was found that there were no other bottles of this particular pack in the shop and that it was, in fact, old stock, in that delivery had not taken place within the last two years and it might actually have been in stock for a much longer period.

SAMPLES CONTAINING EXTRANEEOUS MATTER

During the year under review 48 Food and Drugs samples (28 County) were reported upon adversely because they were found upon examination to contain extraneous matter. The corresponding number in the year 1959, was 49 samples. In addition, a further four samples, found to contain extraneous matter were submitted under the heading of miscellaneous samples and are mentioned in Part VI of this report. Of the 48 Food and Drugs samples 12 (7 County) were samples of milk, the remainder consisted of various types of foods. The wide range of extraneous matter found in the samples included :—fragments of wood, brass wire, iron ribbon (from pan scourer), part of a rusty nail, tinned copper wire, mineral oil, animal skin and hair, brush bristles, jute fibres, iron oxide (rust), partially digested bovine food (cud), transparent adhesive tape, elastic adhesive bandage, animal faecal

matter, parts of tie-on label, broken glass, cardboard, soapless detergent, galvanised steel wire spring, metal jet from bottle-filling machine, cement, fungus, pieces of muslin, paper, phenolic disinfectant and abrasive from scouring powder. Brief details of the eight county samples which were the subject of prosecutions are given below.

Part of a Steak and Kidney Pie, Sample No. 6334.S

This sample, submitted on complaint, consisted of two pieces of a pie. Upon examination a piece of brass wire approximately 3 inches long and 0.022 inch in diameter was found lying on the broken upper crust and on the meat of one of the pieces of pie. In addition to being bent the wire had a regular wavy appearance as if it had originally formed part of a woven metal mesh or had been coiled and then partially straightened out. In the latter case it could have originally formed a spring in an electric light socket. The surface of the wire was slightly corroded and fragments of the pastry of the pie were firmly adhering to it. Legal proceedings were instituted under Section 2 and Section 113 (3) of the Food and Drugs Act directly against the bakery concerned. They pleaded guilty and were fined £10 and £5.19.0 costs (£15.19.0 in all).

Part of a Steak and Kidney Pie, Sample No. C.3972

This sample, also submitted on complaint, consisted of an oblong pie, measuring approximately 5 x $3\frac{3}{4}$ inches, from which one corner had been removed. Upon examination a piece of bovine skin and subcutaneous tissue with adhering hair measuring 1 x $\frac{3}{4}$ x $\frac{3}{8}$ inch, was found lying hair upwards on the meat filling at the point where part of the top pastry had been broken away. Some of the hair was embedded in the remaining top pastry. Legal proceedings were instituted, under Section 2 of the Act, against the vendor, who was also the baker. At the hearing the defendant pleaded "not guilty" but he was fined £10.0.0 and £12.2.0 costs (£22.2.0 in all).

Bovine Oesophagus, Sample No. E.2767

This sample consisted of two pieces of cooked bovine oesophagus, each approximately $1\frac{1}{2}$ inches long and $1\frac{1}{4}$ inches wide. Upon examination the pieces were found to contain three pellets of partially digested grass and other cereal matter (cud). One of the pellets was enclosed in a fold in the inside lining of the oesophagus, the other two pellets were loose. The oesophagus had obviously not been properly cleaned out before being cooked and on being cut open its appearance was anything but appetising. The vendor was prosecuted under Section 2 of the Food and Drugs Act, the Court found the case proved and imposed a fine of £5 and £8.7.0 costs (£13.7.0 in all).

Blackcurrant Jam, Sample No. 7075.S

This sample received on complaint was submitted in an opened 1-lb. jam jar. Very little of the jam had been removed from the jar, the sample weighing $15\frac{4}{5}$ ounces and part of the smooth surface layer was still intact. Upon examination a piece of elastic self-adhesive bandage, measuring $2\frac{5}{8} \times \frac{3}{4}$ inches, was found submerged in the jam just below the broken surface and passing under the unbroken surface. There was no gauze dressing attached to the plaster and the latter only contained 1.0 per cent. of zinc oxide, instead of the normal zinc oxide content of 10.5 per cent. The jam itself, however, contained 75 parts per million of zinc as compared with about 5 parts per million, the amount which may usually be found in jam. As a result of the above findings and other experiments conducted in the laboratory the opinion was expressed that the piece of bandage must either have been boiled with the jam or have been present in the jam while it was still hot. Legal proceedings were instituted against the firm concerned and they were fined £15 and £7 costs (£22.0.0 in all).

Part of a 2-lb. bag of sugar, Sample No. E.2770

This sample was submitted on complaint of its offensive odour and the presence of foreign matter. The sample as received weighed 27 ounces and upon examination it was found to contain two partially dried lumps of cat faeces weighing $14\frac{1}{2}$ grammes. In addition, 71.5 grammes of the sugar were caked and discoloured and were found to contain bile pigments. It transpired that this sugar had been purchased from a branch shop of a multiple firm. Sacks of sugar were stored on the floor on the premises and weighed out there by means of a scoop into paper bags. A cat was kept at the shop. Legal proceedings were instituted against the firm concerned under Section 2 of the Act and they were fined £10 and £12.18.0 costs (£22.18.0 in all).

Bread, Sample No. C.5001

This sample consisted of twelve slices and one end crust of a sliced loaf. Embedded and baked in the surface of the bottom crust of five adjacent slices were five narrow strips of zinc oxide adhesive plaster with attached cotton dressing. The plaster was lying diagonally across the slices and had originally formed one piece, measuring approximately three inches by one inch wide, which had been sliced through in slicing the bread. The cotton dressing side of the plaster was exposed and the opinion was expressed that it had been used, in that part of the outside of the plaster was soiled and the adhesive surface had three dark brown human hairs each approximately half-an-inch long, attached to it. It seemed probable that the discarded dressing had been in the bottom

of a baking tin and that the dough had been placed on it, as no dough was present on the exposed surface of the plaster. Legal proceedings were instituted against the bakery concerned under Section 2 and Section 113 of the Act and they were fined £5.0.0 and £7.0.0 costs (£12.0.0 in all).

Milk, Sample No. E.5057

This sample consisted of a part-filled one-third pint bottle of school milk. The sample when received weighed four ounces and the bottle contained a drinking straw in addition to the milk. The bottle itself was not in any way chipped or broken, but upon examination the milk was found to contain 25 fragments of broken glass weighing, in all, 0.076 gramme. The largest fragment measured 12 x 5 x 1 millimetres. Three fragments of broken glass, submitted separately, were stated to have originally been present in the sample; these weighed, in all 0.012 gramme and could all pass through the drinking straw. All the fragments had identical physical characters which were within the usual range for milk bottle glass. Legal proceedings were instituted under Section 2 of the Act against the dairy company concerned; they pleaded "guilty" and were fined £10.0.0 together with £8.10.0 costs (£18.10.0 in all).

Pickle, Sample No. E.6555

This sample, submitted on complaint, consisted of a part-filled glass jar of pickle from which most of the pickle had previously been removed. The remaining pickle weighed only two-thirds of an ounce but it was found to contain three small fragments of broken glass weighing, in all, 8 milligrams. A relatively large and curved piece of broken glass was submitted separately and was stated to have originally been in the jar of pickle. This measured 29 x 6 x 5 millimetres and weighed 1.12 grammes. The pickle jar itself was intact but the shape and physical characters of the last mentioned piece of broken glass were consistent with it having originally formed part of the rim of the neck of a similar glass jar to that containing the sample. The densities of the three small fragments of glass found in the sample and of the piece submitted separately were all identical and were also the same as the density of the glass of the sample jar. Legal proceedings were instituted directly against the manufacturers of the pickle under Section 2 and Section 113(3) of the Food and Drugs Act. At the hearing of the case the defendants pleaded "Guilty" but were granted an absolute discharge on payment of £5.9.0 costs.

SAMPLES CONTAINING INSECTS OR INSECT REMAINS

Twenty-four food and drugs samples (16 County) were found to

contain insects or insect remains during the year under review. The corresponding number for the year 1959 was 15 (12 County) samples. The more interesting of the County samples are described briefly in the following paragraphs :—

Two Slices of Battenberg Cake, Sample No. E.2766

The head, thorax and abdomen of a winged insect were submitted separately but were stated to have been found in the cake. Beneath the marzipan covering of the cake was a layer of apricot jam ; at one edge the marzipan had been lifted and here the insect was stated to have been found. Upon further examination a wing and part of a leg were found at this same point. The insect proved to be a honey-bee, its body was in a “ candied ” condition and it gave a negative result for the phosphatase test. The opinion was expressed that the insect had not been baked in the cake but was already present in the jam before the latter was spread on the cake. The complainant was notified of the result of the examination and the bakery concerned was cautioned.

Part of a Meat Pie, Sample No. E.5602

This sample consisted of a meat pie, approximately 3 inches in diameter, from which about $1\frac{1}{2}$ inches of the side casing had been removed. The pie contained very little jelly and there were relatively large spaces between the meat filling and the pie casing. In this cavity a small dead blow-fly was found but its body had no particles of dough or pie filling adhering to it ; furthermore, the body of the fly gave a positive phosphatase reaction. The opinion was expressed that the fly had not been heated in the pie and that it would have been possible for it to enter the hole in the top crust at any time subsequent to the pie being baked.

Pickles, Sample No's. E.6140 and E.6141

The second sample, which was submitted on complaint, was found to contain seven green-fly (aphides). Sample No. E.6140 consisted of two further jars of pickle of the same brand from the same shop and these were also found to contain aphides, two in one jar and four in the other. The pickles consisted of mixed vegetables—cauliflowers, onion and gerkins. It is very probable that the aphides had originally been present in the cauliflower and it would have been quite difficult to completely wash them out of the cauliflower before making the pickle. The results of the examination of these samples was brought to the notice of the packers.

Stoned Raisins, Sample No. 7133.S

This half-pound packet of stoned raisins was a routine informal sample purchased by one of the Assistant County Sampling Officers. Upon examining the contents the fruit was found to be covered with sugar deposits and actively growing yeasts, it was also infected with live mites (acari). The total live and dead mites in the contents of the packet was of the order of 50,000. The stock at the shop concerned was examined and surrendered for destruction.

Sliced Tea Cake, Sample No. 1

This sample was submitted by the Chief Public Health Inspector of a County District as the result of a complaint that it had contained a live cockroach. The tea cake had been sliced into top and bottom portions and on examination a large insect was found crushed and dead between the two layers. It was stated that the insect had fallen out of the teacake alive and had been killed and then replaced in the teacake. There were at least two unusual features about this insect which did not corroborate the complainant's story. The insect was not a cockroach, which infests bakeries and other warm places, but it was a ground beetle, approximately one inch long, of the genus *Carabus*, probably *Carabus Nemoralis*. These beetles are carnivorous and are not associated with infestation of food or food-preparing premises. Secondly, the insect gave a strong positive reaction for phosphatase. As a result of this last test, together with certain comparative tests which were carried out, it was concluded that the beetle had not been heated and, therefore, that it had not been in the teacake before it was baked.

Milk Sample No E.6124

This opened pint bottle of sterilised milk, submitted on complaint, was nearly full when received for examination; the contents measured 19 fluid ounces. Six dead fly larvae, each about 3.5 millimetres long were found in the bottle, four were adhering firmly to the sides of the bottle. The larvae were similar to those of small fruit flies (*Drosophilidae*) and they had been subject to heat treatment. Fruit flies breed on fruit, pickles, in vinegar vats and in milk bottles and other food receptacles containing traces of milk, etc. The larvae had, in my opinion, been present in the bottle before it was filled with milk and sterilised. The manager of the dairy concerned was interviewed and cautioned.

Cake, Sample No. E.5073

This sample, submitted on complaint, consisted of a piece of light

coloured cake with two layers of filling and two part slices which had been cut from the main portion of the cake. A dead house-fly, entire except for one wing, was found embedded in the crumb of one of the layers of one of the part slices. The separated wing was found embedded in a corresponding position in the crumb of the main portion of the sample. A phosphatase test carried out on a portion of the fly confirmed that it had been present in the cake before it was baked. Legal proceedings were instituted against the bakers concerned. At the hearing they pleaded "not guilty" but they were fined £10 together with £10.7.0 costs (£20 7.0. in all).

PROSECUTIONS

When the adulteration of a sample is considered to be sufficiently serious, legal proceedings are instituted. Prosecution, however, is only one of the means of dealing with adulterated or otherwise unsatisfactory samples. A perusal of tables 10 and 21, which are concerned with the various types of milk adulteration and sophisticated samples other than milk, respectively, shows that many of the samples are only slightly adulterated. In the case of food and drug samples, other than milk, deterioration may be due to long storage or adulteration may be brought about by the action of some person other than the actual vendor. In these instances it is often considered appropriate to take less drastic action than legal proceedings. In the case of milk samples vendors are sometimes cautioned and subsequent samples then frequently prove to be genuine; in other instances dairies are visited by the Sampling Officers in order to correct faulty dairy management which has given rise to unsatisfactory samples. In the case of other foods and drugs appropriate action may take the form of the surrender for destruction of the remainder of any unsatisfactory stocks, returning stocks to manufacturers or communicating with packers with regard to unsatisfactory labels, etc.

During the year a total of 361 County food and drugs samples were reported upon adversely and in respect of 16 of these prosecutions were instituted, seven in respect of milk samples and eight in respect of samples containing extraneous matter (including one milk sample) and one containing an insect. There were 16 convictions or orders to pay costs. The total fines and costs during the year amounted to £232.14.0. In table 23 will be found similar information for the years 1912 to 1960 inclusive.

Table 23
County Fines and Costs during the Years 1912-1960

YEAR		Number of Prosecutions	Convicted or ordered to pay costs	Dismissals, etc.	Fines and Costs		
					£	s.	d.
1912-1935	...	1,504	1,302	202	6,239	1	7
1936	... ..	22	20	2	107	14	9
1937	... ..	39	36	3	165	1	0
1938	... ..	26	24	2	132	10	1
1939	... ..	19	18	1	100	11	6
1940	... ..	25	23	2	171	14	0
1941	... ..	84	79	5	824	13	2
1942	... ..	38	36	2	502	4	10
1943	... ..	54	49	5	375	10	11
1944	... ..	38	37	1	291	19	6
1945	... ..	33	33	0	365	4	6
1946	... ..	94	92	2	936	7	9
1947	... ..	98	93	5	667	7	0
1948	... ..	70	69	1	703	0	6
1949	... ..	48	45	3	518	17	2
1950	... ..	43	42	1	405	8	7
1951	... ..	50	39	11	362	11	6
1952	... ..	65	64	1	620	13	0
1953	... ..	54	53	1	576	12	8
1954	... ..	45	45	0	294	9	6
1955	... ..	42	41	1	261	7	6
1956	... ..	20	19	1	185	13	6
1957	... ..	21	18	3	371	1	0*
1958	... ..	27	26	1	270	4	7
1959	... ..	17	17	0	279	13	0
1960	... ..	16	16	0	232	14	0
Total	.....	2,592	2,336	256	15,962	7	1

*Includes £105 costs ordered by the Divisional Court resulting from an appeal by way of case stated in respect of Sample No. M.7500 and a fine of £2 and £7 cost on the case being referred back to the Magistrates' Court.

Table 24

Prosecutions arising out of Samples purchased during the year 1960

District	Number of Prosecutions	Convicted or ordered to pay costs	Dismissals, etc.	Fines and Costs		
				£	s.	d.
Audenshaw U.D.C. ...	1	1	—	20	7	0
Bacup Borough ...	1	1	—	7	11	0
Crompton U.D.C. ...	1	1	—	13	7	0
Droylsden U.D.C. ...	2	2	—	45	0	0
Fylde R.D.C. ...	1	1	—	12	0	0
Horwich U.D.C. ...	1	1	—	10	19	0
Longridge U.D.C. ...	1	1	—	24	2	0
Preston R.D.C. ...	4	4	—	27	0	0
Urmston U.D.C. ...	1	1	—	18	10	0
Westhoughton U.D.C. ...	1	1	—	15	19	0
West Lancs. R.D.C. ...	1	1	—	22	0	0
Whiston R.D.C. ...	1	1	—	15	19	0
County Districts ...	16	16	—	232	14	0
Autonomous Authorities	2	2	—	10	0	0
Total—All Sources ...	18	18	—	242	14	0

PART II.—THE MILK (SPECIAL DESIGNATION)
(PASTEURISED AND STERILISED MILK)
REGULATIONS, 1949 TO 1953

THE MILK (SPECIAL DESIGNATION) REGULATIONS, 1960

*Phosphatase Test, Half-hour Methylene Blue Test and
Turbidity Test*

The above Regulations were made jointly by the Minister of Health and the Minister of Agriculture, Fisheries and Food. The Special Designations permitted by the Regulations are, for raw milk, “Tuberculin Tested” and, for heat-treated milk, “Pasteurised,” “Sterilised” and “Tuberculin Tested Milk (Pasteurised).”

All producers' licences are granted by the Minister of Agriculture, Fisheries and Food but as from the 1st January, 1961, all dealers' licences to sell milk, or heat-treated milk are, subject to certain exceptions, granted by Food and Drugs Authorities.

The samples examined during the year under review and listed in tables 25, 26 and 27 were examined by the appropriate tests as described in the Milk (Special Designation) (Pasteurised and Sterilised Milk) Regulations, 1949 to 1953. As from 1st January, 1961, however, the new or modified tests described in the Milk (Special Designation) Regulations, 1960, will apply.

The tests described in the new regulations are :—

The Clot-on-Boiling test for Tuberculin Tested Milk. This test applies to tuberculin tested milk in the possession of the licensed producer and will, therefore, only relate to samples taken by the Ministry. It is designed to show whether methods of production are satisfactory throughout the year and it indicates the end of the life of the milk whether due to souring or to sweet-curdling.

The Methylene Blue test for Tuberculin Tested Milk (obtained from a dealer) and for Pasteurised Milk. This test indicates the probable quality of the milk at the time of its use by the consumer and it depends on the decolorisation of methylene blue by bacteria and reducing substances present in the milk. It is a half-hour test for both types of milk, whereas previously raw tuberculin tested milk was submitted to a $4\frac{1}{2}$ hour or $5\frac{1}{2}$ hour test depending on the time of year. The test is similar, but the conditions are more stringent, to the half-hour methylene blue test previously applied to pasteurised milk. The test is designed to ensure that milk will keep fresh, if kept reasonably cool, until the next day's supply is received by the consumer. With this end in view samples taken from 1st May to 31st October are kept at atmospheric shade temperature until 9.30 a.m. the following day. Samples taken from 1st November to 30th April inclusive are kept at atmospheric shade temperature until 5 p.m. on the day of sampling and then at a constant temperature of $65^{\circ}\text{F} \pm 2^{\circ}\text{F}$. until 9.30 a.m. the next day. The test with the methylene blue solution is carried out for 30 minutes at between $37\text{--}38^{\circ}\text{C}$. and must be commenced between 9.30 and 10.0 a.m. on the day after the sample is taken.

If the atmospheric shade temperature at any time exceeds 70°F . the test shall not be applied. This is a more realistic summer shade temperature than that in the previous Regulations where 65°F . was the maximum limit for the storage temperature (pasteurised milk only). It was in fact, found that the majority of samples passed the test even

when the maximum shade temperature exceeded 65°F. but, because of the limit imposed, the tests had to be declared void.

The Phosphatase test for Pasteurised milk. This test indicates whether heat treatment has been adequate to destroy pathogenic organisms. The Aschaffenburg-Mullen phosphatase test is now used and it depends on the liberation by the enzyme phosphatase of p-Nitrophenol from the buffer-substrate solution. Phosphatase is always present in raw milk but it is almost entirely destroyed by the amount of heat treatment necessary for efficient pasteurisation. The test prescribed in the previous regulations was the Kay-Graham test which depends on the liberation of free phenol from the appropriate buffer-substrate solution.

The new test has several advantages. Incubation at 37°C. is only necessary for two hours instead of 24 hours. The test can, therefore, often be completed on the day of sampling. There is far less likelihood of incorrect results being obtained due to contamination with phenol or the presence of phenol-producing organisms in the milk, as p-Nitrophenol is not in common use in a laboratory and is not produced by bacteria. It is only necessary, therefore, to carry out a blank and test the colour of the buffer-substrate solution for absence of free p-Nitrophenol, whereas previously it was also necessary to carry out a control test on each milk to check the absence of free phenol and phenol-producing organisms.

The test is satisfied by milk which gives a colour reading after incubation for two hours corresponding to the liberation of not more than 10 ug of p-Nitrophenol per ml. of milk. As a general guide to samples that fail the test it may be said that samples which show more than 10 and up to 18 ug are slightly under-pasteurised or contain a small quantity of raw milk (0·1–0·2 per cent.). Samples showing more than 18 and up to 42 ug are under-pasteurised or contain a small quantity of raw milk (up to 0·5 per cent.). Samples showing more than 42 ug are grossly under-pasteurised or contain an appreciable quantity of raw milk. Raw milk would give a colour equivalent to several thousand micrograms of p-Nitrophenol which would not be directly matchable.

The Turbidity test for Sterilised Milk. This test indicates whether sterilisation has been efficient and it is identical with that prescribed in the previous Regulations. It depends on the fact that heating to not less than 212°F. for a period sufficient for effective sterilisation will also completely denature all the soluble protein of the milk. Samples which show the presence of soluble protein after submission to the test are insufficiently heated or contain raw milk.

The conditions for the heat treatment of milk prescribed in the Regulations are as follows :—Pasteurised milk must have been treated by one or the other of the following processes :—

(a) Retained at a temperature of not less than 145°F. and not more than 150°F. for at least 30 minutes and be immediately cooled to a temperature of not more than 50°F. ; or

(b) Retained at a temperature of not less than 161°F. for at least 15 seconds and be immediately cooled to a temperature of not more than 50°F. ; or

(c) Retained at such temperature for such period as may be specified by the licensing authority with the approval of the Minister.

Sterilised milk must have been filtered or clarified, homogenised and thereafter heated to and maintained at such a temperature, not less than 212°F., for such a period as to ensure that it will comply with the turbidity test prescribed.

With regard to the taking of samples the Regulations state that these may be taken at any time when the milk is in the possession of the licensed producer, pasteuriser, steriliser or the licensed dealer. Unopened bottles shall be delivered intact as samples to the testing laboratory but where the milk is in containers exceeding one quart in capacity samples shall consist of not less than two fluid ounces of the milk and shall be taken, using aseptic precautions, from well below the surface of the milk and transferred to a sterile stoppered bottle. Instructions are given in the Regulations with regard to the marking of samples and all samples shall be placed, immediately after taking, in an insulated container which shall not be artificially cooled and they shall be transported to the testing laboratory with the least possible delay. Samples must arrive at the laboratory on the day they were taken, otherwise they must be discarded.

The Milk (Special Designations) (Specified Areas) Orders, 1952 to 1959

The sequence of events since the year 1943, which has resulted in the making of a number of Milk (Special Designations) (Specified Areas) Orders, thereby prohibiting the sale for human consumption of raw undesignated milk in the areas specified, was given in some detail in this report for the year 1958. It is perhaps sufficient to say here that Section 37 of the Food and Drugs Act, 1955, makes it compulsory to use special designations in areas which have been made specified areas by orders made under Section 41 of the Act. The special designations

which may be used in a specified area are "Tuberculin Tested," "Pasteurised," "Sterilised" and "Tuberculin Tested Milk (Pasteurised)."

The first Milk (Special Designations) (Specified Areas) Order which affected part of the area of the County Food and Drugs Authority came into operation on the 1st November, 1952. Eight other Orders, similarly affecting parts of the County, have come into operation since. By the 6th April, 1959, a total of 90 of the 93 County districts in the County Food and Drugs Area had become specified areas.* In view of the fact that it is the duty of the Food and Drugs Authority to enforce the provisions of Section 37 of the Food and Drugs Act, 1955, it follows from the above that an increased number of samples of special designation heat-treated milks are now being taken by County Sampling Officers in the County districts concerned for submission to the County Laboratory for examination by the statutory Phosphatase, Half-hour Methylene Blue or Turbidity tests.

During the year 1,426 samples of milk were submitted for examination by the Phosphatase test, the Half-hour Methylene Blue test or by the Turbidity test. The samples were marked either Pasteurised, Tuberculin Tested (Pasteurised) or Sterilised and tables 25, 26 and 27 give particulars of the results obtained. Of the five County samples which failed the Phosphatase test, one was stated to have been taken at a pasteurising plant and four were obtained in specified areas. One sample taken in a specified area, failed to pass the prescribed Half-hour Methylene Blue test. In addition, three control samples of raw milk were submitted for examination by the Phosphatase test and the Half-hour Methylene Blue test; as was to be expected these samples did not pass the Phosphatase test and two of them also failed to satisfy the requirements of the Methylene Blue test.

* Since writing this report the three remaining County districts became specified areas on the 10th April, 1961, as a result of the making of the Milk (Special Designations) (Specified Areas) Order, 1961.

Table 25

Phosphatase Tests, 1960

Type of Milk	Number Submitted		Number Unsatisfactory					
			County			Borough		
	County	Borough	Group II	Group III	Total	Group II	Group III	Total
Pasteurised ...	596	95	0	2	2	0	0	0
T.T. (Pasteurised)	452	36	1	2	3	0	0	0
Raw	3	0	0	0	0	0	0	0
Totals ...	1,051	131	1	4	5	0	0	0

Table 26

Half-hour Methylene Blue Tests, 1960

Type of Milk	Number Submitted		Number Unsatisfactory	
	County	Borough	County	Borough
Pasteurised	596	94	1	0
T.T. (Pasteurised) ...	452	36	0	0
Raw	3	0	0	0
Totals	1,051	130	1	0

Table 27

Turbidity Tests, 1960

Type of Milk	Number Submitted		Number Unsatisfactory	
	County	Borough	County	Borough
Sterilised	196	51	0	0

PART III.—THE FERTILISERS AND FEEDING STUFFS ACT, 1926

The Fertilisers and Feeding Stuffs Act, 1926, came into force on July 1st, 1928. It is intended to safeguard the purchasers of substances used for the fertilisation of the soil and for the feeding of cattle and poultry.

The general purpose of the Act, like that of the Act of 1906, which it repealed, is to provide civil remedies for the misdescription of, and to prevent fraud in, fertilisers and feeding stuffs. Its scope is defined by Regulations made by the Minister of Agriculture, Fisheries and Food.

In addition, Regulations were made by the Minister of Health during the years 1953, 1954 and 1958 (in exercise of powers first conferred by Section 2 of the Therapeutic Substances (Prevention of Misuse) Act, 1953, now replaced by Section 5 of the Therapeutic Substances Act, 1956), which permit the use of certain antibiotics, *viz.*, penicillin, aureomycin, streptomycin and oxytetracycline, in pig foods and poultry foods and for horticultural purposes. These Regulations prescribe conditions with regard to labelling and also specify in regard to pig and poultry foods maximum limits for the amounts of the prescribed antibiotics which may be present.

It has already been mentioned that the scope of the Fertilisers and Feeding Stuffs Act is defined by Regulations. The Regulations in force for the first nine months of the year under review were The Fertilisers and Feeding Stuffs Regulations, 1955, as amended by the Fertilisers and Feeding Stuffs (Amendment) Regulations, 1956. The Standing Advisory Committee has, however, carried out a general review of the prescribed methods of analysis resulting in the making, in July, of the year under review, of new Regulations, The Fertilisers and Feeding Stuffs Regulations, 1960, which came into operation on the 1st October, 1960. While the changes in the new Regulations are mainly concerned with methods of analysis, there have also been alterations in the general layout to give a more logical sequence to the contents and the "Decimal system" of paragraph numbering is used in the schedules dealing with methods of analysis.

In general, methods of analysis are described in a more precise manner and with much greater detail. The directions for the preparation of samples for analysis require that the representative portion of certain types of fertilisers be ground to pass sieve apertures which are smaller than prescribed in previous Regulations, thereby obtaining more homogeneous material on which to carry out the analysis. The methods for the determination of phosphoric acid and potash have been

changed to bring them into line with present-day analytical practice. The gravimetric magnesium pyrophosphate method for phosphoric acid has been deleted and replaced by a volumetric quinolinium phosphomolybdate method or alternatively by a spectrophotometric (Vanadium Phosphomolybdate) method. A flame photometric method has been introduced as an alternative method for the determination of potash in fertilisers where the potash content does not exceed 20 per cent. by weight. The indicator for the determination of the free acid in sulphate of ammonia has been changed from methyl orange to methyl red or screened methyl red, which are more satisfactory in that they give a sharper end point. In the case of Feeding Stuffs the method for the determination of oil now includes a modified procedure for samples containing full cream dried milk involving adjustment of the moisture content to between 10 per cent. to 18 per cent. otherwise complete extraction of the oil may not occur. The method for the determination of salt in feeding stuffs now requires the sample to be ignited with calcium oxide ; the previous Regulations required sodium carbonate to be used for this purpose.

The prescribed forms of certificate of analysis have also been amended and provision is now made for the Declared Particulars to be inserted in the certificate instead of being attached to it in a separate document as formerly. Furthermore, in the case of samples of fertilisers and feeding stuffs, the compositions of which are found to differ by more than the limits of variation from the particulars declared, the analyst is no longer required to state in what respect there is prejudice to the purchaser but only the simple fact that there is such prejudice, if this is believed to be the case. Similarly, in the case of feeding stuffs, analysts are now required to comment on the certificate as to the suitability of an article for feeding purposes, or whether it contains a deleterious ingredient, only if it is found upon analysis to be not suitable or if it does contain such an ingredient.

Forty-five samples have been examined for the County during the year under review. Of these, 20 were fertilisers and 25 consisted of feeding stuffs. The fertilisers comprised 15 formal samples and five informal samples. All the feeding stuffs samples were formal.

In addition, 25 samples (11 formal and 14 informal) were examined for Autonomous Authorities. Of these 17 samples (three formal and 14 informal) were fertilisers and eight (all formal) consisted of feeding stuffs.

Of the 20 samples of fertilisers examined for the County 12 were found upon analysis to be correct within the limits of variation permitted by Regulations made under the Act, seven showed minor deviations

outside the permitted limits of variation. The remaining informal sample No. 8/9/B, Corporation Manure, was not an article included in the first or second schedules to the Fertilisers and Feeding Stuffs Act, 1926 and it was therefore outside the provisions of the said Act. The manure was of the nature of comminuted domestic refuse.

With regard to the 25 samples of feeding stuffs examined for the County, 22 were found to be correct within the permitted limits of variation, the remaining three showed only minor deviations outside the permitted limits of variation.

The analytical results of all the County samples examined during the year, together with the guaranteed figures contained in the Statutory Statements, are given in the following two tables.

Table 28
Fertilisers

Sample Number and Description	Formal or Informal	Per cent. Nitrogen		Per cent. Phosphoric Acid (P ₂ O ₅)								Per cent. Potash K ₂ O		Other Figs. per cent.
				Total		Soluble		Insoluble		Soluble in Citric Acid				
		G	F	G	F	G	F	G	F	G	F	G	F	
42/10/A Seaforth Tomato Top Dressing	F	6.0	6.3		3.7	2.0	1.8	1.0	1.9			9.0	9.6	
43/10/A Seaforth Strawberry Fertiliser	F	5.0	5.0		5.6	3.0	2.4	2.0	3.2			10.0	10.0	
14/11/A Widnes Compound Fertiliser	F	16.0	16.3		9.4	8.25	8.5	0.75	0.9			9.0	9.7	
15/11/A Widnes Compound Fertiliser	F	5.0	4.8		12.7	11.5	11.25	1.0	1.45			12.5	12.2	
6/9/B Manchester Sulphate of Potash	I											48.0	49.7	
7/9/B Manchester Superphosphate	I			19.0	20.6	18.0	19.1	1.0	1.5					
16/11/A Widnes Compound Fertiliser	F	6.0	5.95		15.85	13.75	14.50	1.25	1.35			15.0	14.45	
17/11/A Widnes Compound Fertiliser	I	16.0	16.0		8.95	8.25	8.40	0.75	0.55			9.0	9.2	

Table 28—continued.

Sample Number and Description	Formal or Informal	Per cent. Nitrogen		Per cent. Phosphoric Acid (P ₂ O ₅)								Per cent. Potash K _½ O		Other Figs per cent.
				Total		Soluble		Insoluble		Soluble in Citric Acid				
		G	F	G	F	G	F	G	F	G	F	G	F	
44/10/A Seaforth Top Dressing	F	13·0	13·0		0·5		0·1		0·4				1·8	
45/10/A Seaforth Compound Fertiliser	F	5·5	6·0		4·75	3·2	2·85	2·65	1·90			6·0	6·3	
39/2/A Lonsdale Nitro-Chalk Fertiliser	F	21·0	21·0											A
2/2/B Lonsdale Superphosphate	I					18·5	18·45							
19/11/A Widnes Granular Triple Superphosphate	F					47·0	47·4							
30/4/A Lower Blackburn Bone Meal	F	3·7	4·1	20·6	22·9									
31/9/A Manchester Blood and Bone Meal Compound	F	6·0	7·1	9·2	9·25									B
32/9/A Manchester Pure Dried Blood	F	12·7	12·9											C
20/11/A Widnes Compound Fertiliser	F	9·0	8·65		8·8	8·25	8·45	0·75	0·35			15·0	15·6	
21/11/A Widnes Compound Fertiliser	F	10·0	9·1		9·85	9·25	9·30	0·75	0·55			18·0	17·7	
33/9/A Manchester Sulphate of Ammonia	F	21·1	21·1											D
8/9/B Manchester Corporation Manure	I		2·2		1·24		0·04		1·20				0·2	

G — Guaranteed.

F — Found.

A — Guaranteed, Carbonate of Lime 35·0 ; Found, Carbonate of Lime 33·5.

B — Guaranteed, Ammonia 7·3 and Tribasic Phosphates 20·1 ; Found, Ammonia 8·6 and Tribasic Calcium Phosphate 20·2.

C — Guaranteed, Protein 79·4 ; Found, Protein 81·0.

D — Guaranteed Free Acid (H₂SO₄) 0·035 ; Found, Free Acid (H₂SO₄) 0·036.

Table 29
Feeding Stuffs

Sample Number and Description	Formal or In- formal	Per cent. Oil		Per cent. Protein		Per cent. Fibre		Other Figures per cent.
		G	F	G	F	G	F	
37/2/A Lonsdale Sow and Weaner Meal...	F	3·5	3·4	16·0	14·4	6·0	4·3	A
38/2/A Lonsdale Intensive Layers Meal...	F	3·5	3·6	18·0	16·8	6·0	4·6	
23/3/A Kirkham Baby Chick Mash ...	F	4·5	4·3	17·5	17·2	5·0	3·9	
24/3/A Kirkham Pig Meal No. 1 (Sow and Weaner) ...	F	3·5	3·9	16·0	16·0	7·0	4·9	
27/7/A Bury Intensive Layers Mash	F	3·0	2·5	17·5	16·4	4·5	4·9	
28/7/A Bury Pure Sussex Ground Oats	F		3·55		9·6		10·1	
22/5/A Hr. Blackburn Pig Food No. 2 ...	F	2·6	3·15	15·3	14·8	5·6	4·6	
23/5/A Hr. Blackburn Laying Mash	F	3·0	2·8	17·0	16·6	6·3	6·2	
28/6/A Leyland Growing Meal	F	3·0	3·5	17·5	18·2	6·0	4·7	
29/6/A Leyland Chick Raising Meal ...	F	3·5	3·2	19·0	17·6	5·5	3·9	
15/12/A Warrington Battery Mash	F	3·5	3·2	17·5	17·5	7·5	4·6	
16/12A/ Warrington Grower's Mash... ..	F	3·5	3·1	17·5	17·0	7·5	4·2	
18/11/A Widnes Meat Meal	F	4·0	6·1	55·0	56·9			B
31/4/A Lower Blackburn Grazing Ration ...	F	4·6	3·9	14·2	14·8	7·0	6·5	
46/10/A Seaforth No. 1 Pig Meal ...	F	4·0	3·8	16·0	15·1	5·0	4·9	
47/10/A Seaforth Battery Layers ...	F	4·0	3·3	17·0	16·4	6·0	4·7	
40/2/A Lonsdale Layers Meal	F	3·5	3·65	17·5	17·6	6·0	5·0	
25/3/A Kirkham Intensive Lay Mash V.A.	F	3·1	3·85	17·9	16·3	3·5	3·4	

Sample Number and Description	Formal or In- formal	Per cent. Oil		Per cent. Protein		Per cent. Fibre		Other Figures per cent.
		G	F	G	F	G	F	
26/3/A Kirkham ... Super Ration ...	F	5.5	3.5	21.0	24.1	6.5	6.4	
29/7/A Bury Baby Chick Mash ...	F	4.5	4.0	19.0	18.6	5.0	3.2	
30/7/A Bury ... Sow and Weaner Meal	F	4.5	3.55	17.5	17.1	6.0	4.6	
48/10/A Seaforth Hen Laying Meal ...	F	3.5	3.15	16.0	17.2	8.0	4.4	
49/10/A Seaforth Sow and Weaner Meal	F	3.0	3.1	17.0	17.1	6.0	4.1	
24/5/A Hr. Blackburn Sow and Weaner Meal	F	3.75	4.1	15.7	17.0	4.7	4.8	
25/5/A Hr. Blackburn Battery Mash ...	F	4.0	4.7	16.0	15.7	6.0	4.4	

A — Found, Sand and Other Silicious Matter 1.0 and Ash 2.9.

B — Guaranteed, Phosphoric Acid (P_2O_5) 11.0 ; Found, Phosphoric Acid (P_2O_5) 9.6, Salt (NaCl) 2.3, Sand and Other Silicious Matter 0.7 and Ash 26.1.

PART IV.—WATERS, EFFLUENTS, etc.

POTABLE WATERS

Eighty-six samples of water have been examined during the year 1960 for suitability for drinking or domestic use. Thirty of these were taken from dairies. Three samples were submitted in connection with the Ministry of Housing and Local Government's geological survey of waters. All were submitted for full sanitary analysis, and are classified in the following table according to their source and organic purity.

Table 30
Waters, 1960

Source	Fit	Doubtful	Unfit	Total
Deep Well	11	9	0	20
Upland Surface	38	12	0	50
Upland Surface mixed with Other Water	4	2	0	6
Spring	1	1	2	4
Shallow Well	0	1	0	1
Miscellaneous	4	1	0	5
Total	58	26	2	86

Sixty-seven of the samples in the above table were taken from public supplies (12 deep well, 49 upland surface and 6 mixed waters). Thirteen of these contained traces of nitrite, which in three cases were also associated with rather high free ammonia contents. Unusually high free ammonias appeared in two other public supply waters and although chemical treatment of the water, or reduction of nitrates, was probably responsible for all of these abnormalities rather than pollution, special consideration of the bacteriological findings was advised in all cases. Reference to the bacteriological reports was also advised in two cases where there was rather more organic matter, probably of vegetable origin, than usual. All other water samples from public supplies were satisfactory.

Nine of the dairy water samples, used for general dairy purposes, were taken from supplies other than public supplies. Four were taken from a water lodge, two from land springs, two from deep wells and one was an upland surface water. High figures for free ammonia which appeared in the well waters probably arose from reduction of nitrates, but special consideration of the bacteriological findings was advised. One of the spring waters, sampled after heavy rain, showed higher figures for total solids, nitrates and chlorides than previously, which suggested that oxidised animal matter was present. Fortunately this water was receiving a very high chlorine dosage, which would have made it safe for the purposes for which it was required. Six of these private supply waters contained unnecessarily high amounts of free chlorine.

Thirteen samples were submitted in connection with complaints of various kinds, only one of which questioned the cleanliness of the supply. This last sample was from a private spring. The water was excessively hard and it showed signs of past pollution. It was considered unsatisfactory for drinking purposes.

Three complaints were received about free chlorine imparting a taste to waters from public supplies. The amounts found were 0·11, 0·13 and 0·4 parts per million respectively. The last of these was unnecessarily high, and might have been detectable to a discriminating palate. Apart from these three waters, the range for residual free chlorine found in service mains was from nil to 0·11 part per million.

Six samples were examined in connection with proposed new supplies, five being deep well waters, and one a stream.

Thirty of the 86 samples were submitted by the County Medical Officer of Health, two by the County Architect, and the others by the following Local Authorities :—City of Lancaster, 4 ; County Boroughs of Preston, 2 ; Southport, 5 ; Boroughs of Chorley, 3 ; Darwen, 9 ; Leigh, 1 ; Morecambe, 1 ; Urban Districts of Carnforth, 2 ; Formby, 1 ; Grange, 6 ; Kirkby, 1 ; Orrell, 1 ; Standish with Langtree, 3 ; Thornton Cleveleys, 2 ; Up Holland, 2 ; Windermere, 2 ; Withnell, 1 ; Rural Districts of Chorley, 1 ; Fylde, 1 ; Garstang, 2 ; North Lonsdale, 1 ; Lunesdale, 3.

TOXIC METALS IN WATER

Every sample of potable water submitted to the laboratory in 1960 was tested for lead, copper and iron. Sixty-nine of them were also tested for zinc.

Only one sample contained lead, the amount being 0·8 part per million, which is in excess of the usually accepted limit of 0·3 part per million. It was an acid upland surface water and treatment was advised.

Nineteen waters contained traces of copper. The International Standard for copper in drinking water is 1·0 part per million and this amount was exceeded in only one case, this being from a new building where slightly corrosive water was being allowed to stand in the freshly installed copper pipework. The spectacular result of this was that aluminium ware was being severely corroded. The reservoir water which supplied the premises contained only 0·02 part per million of copper compared with the 2·0 part per million responsible for the

damage to aluminium utensils. Water from the same building, after the precaution of flushing the pipes had been taken, contained only 0.35 part per million. The only other two waters which contained significant amounts of copper were both taken as the result of complaints. One was from a private spring, which for other reasons was considered unfit for drinking, and contained 0.8 part per million of copper; the other, which was causing staining, contained 0.46 part per million. No other water contained more than 0.25 part per million of copper.

Only three waters were found to contain zinc. The usually accepted limit for zinc of five parts per million was reached only in the case of one sample submitted to assess its suitability as a small supply of domestic water. A water submitted on complaint of the presence of rust was found incidentally to contain 0.4 part per million of zinc and 0.15 part per million was found in a sample submitted because of discoloration.

Iron was found in all the samples of potable water submitted and 24 samples contained quantities in excess of the 0.3 part per million usually regarded as the limit above which complaints of turbidity or staining may arise. In fact, six such complaints were investigated by the laboratory. The results for iron are summarised in table 31.

Table 31

Iron parts per million	Less than 0.1	0.1 to 0.29	0.3 to 1.0	1.1 to 5.0	5.1 to 10	More than 10
Number of samples	14	48	19	4	0	1

Three of the waters with iron contents exceeding 1 part per million were from new borings. The highest iron content, which amounted to 19.8 parts per million, was in a hard, corrosive, well water submitted when a householder complained about the rusty deposit which appeared when the water was heated.

Manganese was also present in the last mentioned sample to the extent of 4.9 parts per million. Manganese is often associated with iron and its effect on the water it contaminates is similar to that of iron, producing defects of colour and flavour. The usually accepted limit for it is 0.1 part per million. Only three waters were examined for manganese, one being free from it. The third sample was another well water which showed an excess, its content being 0.6 part per million. This was a new boring and it also showed an excess of iron.

Six waters were examined for fluoride. These contained quantities ranging from 0·06 to 0·14 part per million. Dental fluorosis in children is caused by concentrations greater than one part per million. A complete mineral analysis was carried out on one of these waters.

OTHER WATERS, EFFLUENTS, ETC.

Forty-eight samples were submitted under this heading.

Two samples of untreated sewage taken in connection with a proposed design for a new sewage works showed upon examination that they corresponded with the classification "Weak Sewage."

Two further samples of sewage also taken in connection with a proposed plant improvement showed that, although the existing plant was achieving a purification of approximately sixty per cent. between the filter beds and the final effluent, the present final effluent only just complied with the general standard recommended by the Royal Commission on Sewage Disposal.

Two stream waters, taken to assess the effect of an outfall upon the water, showed that the stream corresponded to the classification "River of Doubtful Purity" above the outfall and became a "Bad or Polluted River" below it. Another stream water from the same district corresponded with the classification "Very Bad River."

Three stream waters, and a water from a drift mine were taken in order to establish the effect of road widening upon their possible use as a source of potable water. In their present state they correspond with the classification, "Very Clean."

Thirty-seven samples of swimming bath and sea bathing lake water were examined for compliance with the Ministry of Health Recommendations (pH should exceed seven but should not exceed eight and free chlorine should not be less than 0·2 part per million, or much greater than 0·5 part per million). Higher chlorine residuals, however, are desirable where breakpoint chlorination is used; also at times of heavy bathing, when there is an increase in the amount of ammonia in the water, it is wise to increase the dose to give an effective residual of free chlorine. Therefore, although fifteen samples showed higher chlorine contents than the above recommendations advocate, in no case was advice given to reduce chlorine doses. In one case, where ammonia and nitrites were present in a water which already contained more than 0·5 part per million of chlorine, it was even suggested that chlorination be further increased for overnight contact. Fifteen samples of swimming bath water contained insufficient chlorine. Surprisingly one of these was brought to the laboratory because there had

been a suggestion that the bath water contained an excessive amount ! The remaining seven samples complied with the recommendations as to chlorine content and all the samples were within the recommended limits for pH value.

PART V.—RADIOACTIVITY

Radioactivity determinations were commenced in September 1958 and measurements have continued to be carried out throughout each month of the year under review on samples of rainwater, tapwater and milk. Representative samples of other foodstuffs have also been examined during the year to determine the level of contamination in this part of the country and to gain the necessary experience of the lengthy chemical and physical methods involved in the determination of very low levels of radioactivity. From the middle of August measurements have also been carried out on deposits collected from the atmosphere by air filters for comparison with the activity collected by the rain gauge and to ascertain whether the former was a better or more convenient method of detecting any release of radioactivity into the atmosphere.

There were two small nuclear test explosions in the Sahara on February 13th and April 1st, 1960, the radioactivity fallout from these, although detectable in this country in rainwater and milk, gave an amount of strontium 90 which was small compared with that still being deposited from the large explosions in 1958.

During the year under review 71 samples were examined for radio activity, these were made up as follows :—milk 20, upland surface tap water 13, rainwater and deposits 12, vegetables 4, cereals 4, dried fruit 3, baby food 1, canned fish 1, air filters 10 and teeth 3.

RADIOACTIVITY OF RAINWATER

The very fine radioactive debris from nuclear tests settles back to the ground very slowly with a mean life in the atmosphere of between 1 to 5 years. Rain is the chief way in which the particles are removed from the lower atmosphere, so that a rainwater deposit gauge provides a convenient method of monitoring for fallout. In 1960, owing to the age of the majority of the fallout material, most of the short-lived isotopes had disappeared and only strontium 90 and caesium 137, with half lives of 28 and 30 years respectively, were of any significance. The amounts of these two elements found in rainwater, collected in an 18 inch square rain gauge on the roof of the County Laboratory, are tabulated in Table 32. The amount of strontium 90 in the lower atmosphere (as measured by the amount per litre in the rainwater)

reached a maximum in June, this peak, which occurred in May in the previous year, is due to seasonal movements of masses of air in the upper atmosphere. Radioactive material from the relatively small French atomic explosion in the Sahara on February 13th, 1960, appeared in the rainwater collected in February, March and April as shown by the increase in the strontium 89 to strontium 90 ratio. Strontium 89, with a half life of 50.4 days, had practically disappeared from fallout material due to the 1958 series of nuclear tests and its reappearance proved the presence of fresh fission products. Calculation showed that less than one per cent. of the total strontium 90 and caesium 137 found during these three months was due to the French tests.

The amount of strontium 90 collected during 1960 was 1.38 micro microcuries per litre of rainwater and was equivalent to 1.49 millicuries deposited per square kilometre. These figures are approximately one-seventh and one-fifth respectively of the corresponding amounts found in the year 1959.

AIR SAMPLING

Measurements of artificial radioactivity in deposits collected directly from the atmosphere were commenced in August, 1960. The method employed for collecting the sample consisted of drawing air at the rate of approximately 65 cubic feet per hour through a paper thimble for two weeks. At the end of this period the activity of the dust collected on the filter was measured after allowing sufficient time for the natural activity to disappear. Strontium 90 was later determined on the combined deposits from several filters. The results, which are recorded in table 33, show that the actual concentration of strontium 90 in the atmosphere near the ground during the latter half of 1960 was extremely small. An adult breathes about 20 cubic metres of air a day and it should be noted that the amount of strontium 90 found in this volume, *viz.*, 0.016 micro microcuries, is negligible compared with the 5 micro microcuries taken into the body daily in food. A comparison of the rain gauge and air filter results illustrates the large volume of air scrubbed by falling raindrops. The 18-inch square rain gauge in a month collects the same amount of strontium 90 as would be collected by filtering 1.75 million cubic feet of air at ground level. The rain gauge is therefore much more sensitive in measuring fallout. Air sampling, however, has the advantages of easier counting with less manipulation and, especially in dry periods, provides a quicker method of detecting new or accidental releases of radioactivity.

DRINKING WATER

Mains tap water from an upland surface gathering ground was also examined each month for radioactivity. The results recorded in table

34 were obtained by collecting 20 to 25 litres of water over three to four days in each month. After evaporating down to 50 mls. the total beta activity was measured in a liquid geiger muller counter. Combined samples each covering two months and equivalent to 40 to 50 litres of water were used for the chemical separation and determination of strontium 90.

It will be noted from table 34 that the strontium 90 concentration in the tap water was practically constant over the first half of the year but fell steadily during the latter half. The average concentration of this isotope for the year was 0.32 micro microcuries per litre compared with 0.75 micro microcuries per litre in 1959. These figures are much lower than the recommended maximum limit of 20 micro microcuries per litre for strontium 90 in drinking water.

A caesium 137 determination was also carried out during April and this again showed, as found the previous year, that caesium is removed much more thoroughly than strontium from rainwater during its passage through soil. The ratio of caesium 137 to strontium 90, which is approximately 2 in rainfall was only 0.36 in this tap water.

Milk

Samples were examined regularly throughout the year because milk is known to be the principal food from which strontium 90 at present enters the diet in the United Kingdom and because it may form the sole diet of infants. To obtain representative samples of milk produced or consumed in the County area an aliquot portion was taken from each sample of heat-treated milk received in the laboratory for the regular bi-monthly testing of processing plants in the County area. The resulting bulked samples, each representative of approximately two million gallons of milk, were examined for strontium 90 each month.

The results obtained for strontium 90 and caesium 137 in milk during 1960 are shown in table 35. These two isotopes were present in highest concentration during the first four months of the year when the cows were eating mainly stored food contaminated by the heavier fall-out of the previous year. During the summer the level of strontium 90 gradually fell, the lowest figure for the year being obtained in October. The levels for strontium 90 rose again at the end of the year to the concentration found in May, this was to be expected as the cows would then be feeding on hay produced about that period.

The average concentration of strontium 90 in milk for 1960 was 5.85 strontium units and was just half the value found for the year 1959.

A small amount of strontium 89 from the French explosions was detected in April and May. This was to be expected following its presence in rainwater in February to April. This was useful information as it enabled an approximate estimate to be made of the proportion of old and recently deposited fallout in the milk. From the ratio of the two strontium isotopes it would appear that about half of the strontium 90 in the milk at this period was due to fallout deposited during the previous two months and the other half to strontium deposited earlier or taken up by the grass from the soil.

The ratio of caesium 137 to strontium 90 found in milk over the year was 6·6 as compared with 2·0 in rainwater. This difference is probably due to there being a higher discrimination factor against strontium than against caesium in their passage from the food to the milk in a cow's body. The above ratio also appeared to decrease steadily during the year; possibly because caesium is held very firmly in soil and so is less available to the grass than strontium.

Other Foodstuffs

The results obtained are listed in table 36. The amounts of strontium 90 found in the two samples of brussels sprouts, one bought in January and one in October, were very similar but were only approximately one-fifth of the amount found in a similar sample in January, 1959. The main crop potatoes, however, had the same concentration of this element as a corresponding sample taken in 1959.

The cereals showed the highest strontium to calcium ratio for articles in the diet for the year under review. The values found for the wholemeal flour and the oatmeal of 65 and 39 strontium units respectively were, however, appreciably lower than those found in the previous year (92 and 50 strontium units respectively). The contamination in cereals is, at present, mainly in the outer part of the grain and much is removed with the husks in milling processes. Thus the value calculated for white flour as milled was approximately 16 strontium units or one quarter of that in the wholemeal flour. The strontium to calcium ratio was still further reduced in white flour before it leaves the mill to 2·5 units by the compulsory addition of creta praeparata, as required by the Flour (Composition) Regulations, 1956. The addition of creta was originally decided upon on purely nutritional grounds but it is also proving beneficial in lowering the strontium 90 uptake from the whole diet. The amount of creta added to flour constitutes approximately one quarter of the calcium in the average diet.

Proprietary cereal-based infant foods are an important part of

the diet of many infants. A composite sample drawn from four proprietary brands was, therefore, examined for strontium 90. These products consisted of varying proportions of cooked wheat, barley and oats together with milk powder, malt and yeast ; in addition, all contained added calcium phosphate. This latter additive offsets the relatively high amount of strontium 90 per kilo and so brought the strontium 90 to calcium ratio nearer to that in milk. Since the weight of these foods used in the daily diet of infants is very much smaller than that of the milk consumed, the use of these cereal products is not likely to raise the Sr/Ca ratio by more than 15 per cent. compared with a diet based solely on milk.

Interpretation of Results

The micro microcurie unit used in this work is a measure of the activity of a radioactive isotope and is equivalent to that of one millionth of a millionth of a gramme of radium. In the case of strontium 90, one micro microcurie means that, on average, 2.22 atoms are breaking down per minute to give, with its daughter product yttrium 90, 4.44 beta particles per minute. Calcium and strontium are transferred from the diet to the bone in a relatively constant ratio, calcium, therefore, depresses the absorption of strontium by the skeleton. The amount of strontium deposited in the bone is determined by the ratio of strontium to calcium in the total diet and not by its content of strontium alone. In comparing diets or the effects of different foods, therefore, it is the strontium 90 to calcium ratio which is of importance ; this ratio is conventionally expressed in terms of strontium units where one strontium unit is equal to one micro microcurie of strontium 90 per gramme of calcium.

From the results obtained in 1960 it can be calculated that an adult diet over the year would have a strontium 90 to calcium ratio of approximately 5 strontium units. The body discriminates to some extent against strontium so that this element is absorbed and retained at only one quarter of the rate for calcium. Thus the level of 5 strontium units in the diet will lead to 1.25 strontium units in the growing bone ; this should be compared with the limit of 67 strontium units recommended as the maximum permissible body burden in large populations by the International Commission for Radiological Protection.

Teeth

Three groups of sound teeth from school clinics, for the obtaining of which I am indebted to Mr. L. B. Corner, Principal School Dental

Officer, were examined for strontium 90 with the following results.

Age of Children	Calcium per cent.	Strontium 90
Group A.—18 years and over (July and December, 1960)	28.1	Less than 0.02 S.U's.
Group B—12–17 years (July, 1960) ...	26.3	0.10 \pm 0.03 S.U's.
Group C—9–11 years (July and Dec- ember, 1960)	26.9	0.39 \pm 0.04 S.U's.

Initially the idea of this work was to try to obtain a direct measure of the strontium 90 body burden in children. However, on going more deeply into the structure and growth of teeth, it was realised that the permanent teeth are formed early in life and once the dentine and enamel have calcified they contain no living cells and therefore do not remodel in the same way as bone. For example :—premolars commence calcification when a child is two years old and it is complete at the age of 12, most of this change taking place in the first five years. It follows that most of the calcium in the above teeth, even in the youngest group, would have been deposited before the year 1958 and will not have been affected appreciably by the peak concentration of strontium 90 in the diet which occurred in the year 1959. As already mentioned the ratio of strontium 90 to calcium in the bone is only one quarter of that in the diet. Taking Group C as an example there must, therefore, have been an average of approximately 1.6 strontium units in the diet over the period during which the teeth were being formed. The average ratio of strontium 90 to calcium in diets over the last two years was approximately 11 strontium units in 1959 and 5 strontium units in 1960 ; it may not be until about the year 1966 that the teeth of those children who will then be nine to eleven years old will reflect these higher ratios.

Table 32

*Radioactivity of Rainwater and Deposit**(Results are totals from samples collected in an 18-inch square funnel)*

Month	Amount of Rain Collected	Rainfall	Beta Activity of Acid Sol. Matter	Strontium 89	Strontium 90	Caesium 137
1960	Litres	Inches	Counts per min. in Liquid Counter	Micro Microcuries	Micro Microcuries	Micro Microcuries
Jan.	31.50	5.92	159	0.9	32.4	—
Feb.	10.74	2.02	115	10.1	25.4	41.3
March	6.14	1.15	92	5.7	14.3	—
April	11.38	2.14	115	8.5	25.5	64.6
May	11.51	2.16	143	None detected	40.8	75.9
June	5.00	0.94	80	„	23.0	—
July	28.50	5.35	141	„	51.1	99.6
Aug.	27.53	5.17	98	„	41.7	77.4
Sept.	19.36	3.64	53	„	17.3	37.2
Oct.	11.75	2.21	29	„	7.5	18.0
Nov.	43.71	8.20	62	„	19.4	36.8
Dec.	20.47	3.85	49	„	14.2	29.9

Table 33
Radioactivity Measurements on Air Samples

Sampling period	Per 1,000 cubic metres		
	Suspended Matter collected in Filter	Total Beta Count	Strontium 90
1960	Milligrams	Counts per minute	Micro microcuries
22nd Aug.–31st Aug. ...	79	7.0	1.3
1st Sept.–15th Sept. ...	94	6.0	
16th Sept.–30th Sept. ...	143	5.3	
1st Oct.–16th Oct. ...	151	3.3	0.82
17th Oct.–31st Oct. ...	223	2.5	
1st Nov.–15th Nov. ...	141	2.3	
16th Nov.–30th Nov....	209	2.3	
1st Dec.–15th Dec. ...	295	3.3	
16th Dec.–2nd Jan. '61 ...	205	3.3	

Table 34
Radioactivity of Mains Tap Water 1960
(Upland Surface Gathering Ground)

Dates of Collecting Water Samples	Total Beta Count (1)	Strontium 90
1960	counts/min./litre in liquid counter	micro microcuries per litre
8th, 15th, 20th, 21st ... Jan.	0.71	0.43
4th, 11th, 27th ... Feb. ...	0.82	
2nd, 10th, 17th, 31st ... March ...	0.73	0.42
11th, 20th, 25th, 29th ... April ...	0.75	
9th, 18th, 27th ... May ...	0.52	0.41
10th, 16th, 27th ... June ...	0.54	
8th, 15th, 25th ... July ...	0.77	0.32
9th, 17th, 30th ... Aug. ...	0.43	
12th, 20th, 27th ... Sept. ...	0.50	0.22
10th, 18th, 28th ... Oct. ...	0.50	
8th 15th, 21st, 28th ... Nov. ...	0.44	0.15
8th, 14th, 19th, 30th ... Dec. ...	0.36	

* Cs. 137 March and April was 0.15 micro microcuries per litre.

(1) The natural potassium gives a count of approximately 0.1 cpm/litre.

Table 35

Strontium 90 and Caesium 137 in Milk

Month 1960	Number of Milks Sampled	Strontium 90		Caesium 137	Ratio Cs 137 Sr 90
		Micro Microcuries per gm. Ca.	Micro Microcuries per Kilo.	Micro Microcuries per Kilo.	
Jan.	145	7.7	8.7	72.4	8.3
Feb.	141	9.0	10.1	74.0	7.3
March	105	7.3	8.2	48.7	6.7
April	96	7.3 (Sr. 89 1.0)	8.1	64.0	7.9
May	144	5.9 (Sr. 89 0.75)	6.7	39.6	5.9
June	56	5.1	5.7	—	—
July	162	5.1	5.7	28.1	5.5
Aug.	130	4.7	5.2	—	—
Sept.	89	4.35	4.95	—	—
Oct.	134	3.6	4.3	—	—
Nov.	125	4.2	4.85	22.5	4.2
Dec.	96	6.0	6.8		

Table 36
Strontium 90 in Foods, 1960

Lab. No.	Sample	Date	Calcium	Strontium 90	
			Per cent.	Micro Microcuries per kilo	Micro Microcuries per gm. Calcium
R.157	Brussels Sprouts	7.1.60	0.0306	1.9	6.1
R.191	Brussels Sprouts	19.10.60	0.0312	2.3	7.3
R.192	Potatoes (four samples)	19.10.60	0.0075	1.3	17.1
R.200	Carrots	16.11.60	0.0323	0.8	2.3
R.209	Dried Fruit (27 samples Raisins, Currants, Sultanas)	May- Dec. in- clusive	0.069	6.4	9.25
R.158	Dried Bilberries	9.3.60	0.086	81.0	188.0
R.179	Wholemeal Flour	26.7.60	0.036	23.4	65.0
R.208	White Flour (22 samples)	Jan.- Sept. inclusive	0.144 (0.122% added Ca.)	3.6	2.5 (16.4 on Natural Ca.)
R.210	Oats and Oat- meal (27 samples)	Jan.- Nov. inclusive	0.0522	20.5	39.2
R.211	Barley (15 samples)	Jan.- June inclusive	0.020	14.5	73.0
R.193	Cereal-based Infant Foods (4 samples)	21.10.60	0.556	50.6	9.1

PART VI.—MISCELLANEOUS SAMPLES

This section of the report includes those samples which, because of their nature or because of the circumstances under which they were obtained, could not be included in previous sections of the report. Four hundred-and-nine samples were examined under this heading and they were submitted as follows : County Medical Officer of Health, 15 ; County Education Officer, 1 ; Chief Officer, County Fire Brigade, 2 ; Preston and Chorley Hospital Management Committee, 3 ; City of Lancaster, 68 ; County Borough of Preston, 95 ; County Borough of

Southport, 23 ; Borough of Leigh, 83 ; Borough of Lytham St. Annes, 1 ; Urban District of Formby, 12 ; Urban District of Grange, 1 ; Urban District of Orrell, 1 ; Urban District of Walton-le-Dale, 12 ; Rural District of Preston, 2 ; 90 samples were also examined for the information of the laboratory. The work carried out on some of the more interesting of these samples is discussed briefly in the following paragraphs.

ATMOSPHERIC POLLUTION

During the year 1960, 163 deposits and rainwater from soot gauges and 127 lead peroxide candles were analysed. These measurements were made on behalf of the County Borough of Preston, the County Borough of Southport, the City of Lancaster, the Borough of Leigh and the Urban Districts of Formby and Walton-le-Dale.

The standard soot deposit gauge consists of a large glass funnel of known area leading into a bottle large enough to hold a month's rainwater. The soot and water collected are brought into the laboratory at the end of each month for analysis, the minimum number of determinations carried out being those listed in table 37. The sulphur candles are porcelain cylinders of known area which are covered with a layer of lead peroxide prepared under standard conditions. This surface, on exposure at the site, reacts chemically with sulphur gases present in the surrounding atmosphere and when it is examined at the end of the month its sulphate content is proportional to the average concentration of corrosive sulphur gases in the air at that point for the whole of the month. This information is important as it is an indication of the effect of the polluted atmosphere on paintwork, metals, curtains, etc. Steps are now being taken by the establishment of smokeless zones to reduce the amount of smoke emitted into the atmosphere. The results obtained from sulphur estimations on the atmosphere will be helpful in deciding whether corresponding legislation is needed to control the emission of sulphur gases arising from industrial processes and from the burning of fuels.

To illustrate the nature and magnitude of the results obtained in this type of work the average monthly figures for the three sites in the Borough of Leigh for the year 1960 are set out in tables 37 and 38. The Manchester Road and Firs Maternity Home sites are approximately one mile to the East and West of the central Town Hall site respectively. The results obtained for sulphur dioxide do not show any appreciable changes from those determined over the previous three years. The results of the soot gauge determinations show that insoluble solids were higher than normal in the Firs Maternity Home gauge, due to the high amounts (approximately 17·3 tons per square mile) found in April

and May of the year under review, when the deposits were found to contain fine particles of unburned coal. On the other hand, for the third successive year, the Town Hall site shows an appreciable reduction in insoluble deposit, the figure for the year 1960 being 17 per cent. lower than the corresponding figure recorded for the previous year in spite of a much higher rainfall.

Table 37

Soot Gauge Observations, 1960

Monthly Averages in Tons per Square Mile

Site	Borough of Leigh		
	Manchester Road	Town Hall	Firs Maternity Home
Rainfall in inches ...	3.86	4.29	4.49
Carbonaceous matter and tar ...	2.51	4.15	4.02
Ash ...	6.00	7.85	6.03
Soluble deposit ...	5.25	6.67	6.40
Total deposit ...	13.76	18.67	16.45
pH ...	4.1	4.1	4.6

* Insoluble Deposit.

Table 38

Estimation of Active Sulphur by Lead Peroxide Method—1960

Milligrams of Sulphur Trioxide per 100 sq. cms. of Batch “A” Lead Peroxide

Site	Borough of Leigh		
	Manchester Road	Town Hall	Firs Maternity Home
Daily Averages ...	2.16	2.34	1.92

EXTRANEOUS MATTER IN MILK BOTTLES

In addition to the samples of food submitted under the Food and Drugs Act which were found to contain extraneous matter the following samples were also examined as the results of complaints. Of the four samples mentioned below three were submitted by the County Medical Officer of Health and one by the Chief Public Health Inspector of a County District.

Part Filled Bottle of Pasteurised Milk, Sample No. M.8439

This sample consisted of an opened pint bottle of pasteurised milk from which approximately $3\frac{1}{2}$ fluid ounces of the milk had already been removed. The sample was submitted on complaint that it contained hay seeds. It was found upon examination to contain six small cylindrical green leaves, each approximately 3.5 millimetres long, of the character of leaves derived from a species of erica (heath). Upon further enquiry by the Sampling Officer it was ascertained that the milk had been poured into a jug and then poured back into the bottle and that a heather plant was kept on the window ledge in the complainant's kitchen.

Part Filled Bottle of Milk, Sample No. M.8637

This opened pint milk bottle contained approximately eight fluid ounces of milk when it was submitted for examination. In addition, it was found to contain a loosely wrapped ball of metal foil weighing 0.7 gramme and consisting of three pieces of foil measuring approximately 5 x 2 inches, $3\frac{1}{2}$ x 2 inches and 1 inch square respectively. The foil would not easily pass through the neck of the bottle and it had the appearance of foil used in cigarette packets. It was found upon examination to consist of pure aluminium. No aluminium had dissolved in the milk.

Milk Bottle, Sample No. M.8749

This half-pint milk bottle was empty when received except that it contained a layer of white crumbly deposit over the bottom of the bottle. 1.4 grammes of this deposit was present in the bottle and it was found to have the composition of builders' lime which had partially set in the bottle and which had been in contact with milk.

Milk Bottle, Sample No. M.8786

This pint milk bottle was also empty except for a few drops of curdled milk and a thin black film of foreign matter measuring approximately $2\frac{1}{2}$ inches by $1\frac{1}{4}$ inches and weighing 0.23 gramme. The film

was loose in the bottle but one of its long sides was in the form of a moulded arc which fitted the inside bottom rim of the bottle. The foreign matter was found upon examination to consist of a dried film of black cellulose acetate lacquer. The film was quite rigid, it was not softened by hot water and would not easily pass through the neck of the bottle.

The following miscellaneous samples may also prove of interest :—

Toothpaste, Sample No's. M.8734/5/6 and M.8741/2/3

Following a report that three years ago several makes of toothpaste sold in Australia were packed in lead tubes and that the actual tooth pastes, in two instances, were found to contain what were regarded as excessive quantities of lead it was decided to examine a representative selection of samples. The above six samples, all of different brands, packed in collapsible metal tubes were submitted. Upon examination, however, they were all found to be packed in aluminium tubes and both the metal of the tubes and the tooth pastes were free from lead. One of the samples was coloured red ; the colouring matter was found to be Red F.B. which is a coal tar colour permitted for use in food.

Lipstick, Sample No's. M.8738/9/40

The position with regard to the nature of the colouring matter found to be present was not, however, so satisfactory in the case of the above three samples of lipstick. The base of all three samples was a mixture of wax and solid fats, containing approximately 5 per cent. of colouring matter in two instances and 10 per cent. colouring matter in the remaining sample. All three samples were found to contain eosin and two of the samples also contained Rhodamine B. Both these colouring matters are non-permitted food colours and were classified " C " (i.e., colours shown to have, or suspected of having, harmful effects on health) by the Preservatives Sub-Committee of the Food Standards Committee in their reports on colouring matters. The Colouring Matter in Food Regulations, 1957, do not apply to pharmaceutical products or to cosmetics but within recent years colouring matters in British Pharmaceutical and British Pharmaceutical Codex preparations have been changed to colours which are regarded as harmless. In view of the relatively large amounts of colouring matters present in lipsticks compared with the very small amounts normally used to colour food, it is surprising that colouring matters other than those regarded as harmless should continue to be used in any preparation which comes into contact with the lips and mouth.

Silt and Scale, Sample No's. M.8773 and M.8776

These samples were submitted by the water engineer of a County District. They were both taken from a deep well in which a submersible pump was in use. The hard plastic-like scale had formed to such an extent on the impellers and other parts of the pump that it was impossible to restart it after only 2,000 hours use. Upon examination both the silt and the scale were found to contain approximately 90 per cent. of barium sulphate and between 6 per cent. to 7.5 per cent. of other barium compounds. Barium sulphate (baryte or heavy-spar) is present in mineral deposits in the North of England, but your Analyst has been unable to find any previous record of it having gained access to a well. This mineral has a density of approximately 4.5 and could have been separated, as a result of this, from other finely divided mineral matter which had been sucked into the well and thereby concentrated in a fairly pure form. The silt may then have been formed into a scale by the pressure of the moving parts of the pump. Alternatively, soluble barium salts entering the well in water from one strata may have been precipitated by interaction with soluble sulphates in water from an adjacent strata.

Deposits from Effluents, Sample No's. M.8784 and M.8785

These were dark and light coloured effluents with deposit taken at different times from a sewage works which was receiving a trade effluent. An agreement was in operation as to the range of pH values acceptable and maximum limits were stipulated as to the total solids content of the effluent, the amount of solids in suspension, its concentration of certain chemicals, etc. Upon examination it was found that both samples contained approximately ten times the agreed limit for total solids and the pH value of the first sample was too alkaline. Both samples had a high iron content and were generally similar in composition; the differences in colour were due almost entirely to the formation of dark coloured iron compounds in the first sample due to its excessive alkalinity.

Deposit from Drain, Sample No. M.8812

This deposit was submitted by the Chief Public Health Inspector of a County District in order to ascertain its nature and possible method of removal other than by opening up the drain. It was being formed in drains approximately 10 feet from kitchen sinks and was confined to certain houses where soap rather than soapless detergents were being used. The granular deposit had the following composition :—

Moisture	59·8
*Total Fatty Acids	31·8
Unsaponified Fat, etc.	7·0
*Mineral Matter	1·4
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	100·0
	<hr/>

* including 5·2 per cent. of calcium soaps of the fatty acids.

The sample consisted of an emulsion of relatively high melting point fatty acids, calcium soaps and fat with water. The formation of the deposit was probably accelerated by the hard nature of the water supply causing precipitation of fatty acids from soap, etc. It was suggested that use of a mobile steam generator or, alternatively, caustic soda or a proprietary alkaline preparation with very hot water should prove effective in removing stoppages.

Deposit from Petrol Tank of a Motor Vehicle, Sample No. M.8813

This deposit submitted by the Chief Officer, Lancashire County Fire Brigade, consisted of approximately eleven ounces of black readily pulverisable flakes and powder which gave the following results upon analysis :—

Volatile Matter (Petrol, etc.)	10·8
Non-volatile ether extract	0·5
Carbon (by diff.)	75·6
Total Nitrogen (as Ammonia NH ₃).....	6·0
*Mineral Matter	7·1
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	100·0
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*Including Acid Insoluble Ash 3·4 per cent.

„ Iron (as Fe) 0·79 per cent.

„ Potassium (as K) 200 parts per million.

The above results, and particularly the figures for the acid insoluble ash, nitrogen, iron and potassium contents of the sample, were consistent with it being domestic or chimney-stack soot rather than engine deposits.

In addition, in connection with the placing of contracts, two samples of rose hip syrup were examined for the County Medical Officer of Health, one sample of granular compound fertiliser was examined for the Chief Education Officer, one sample of anti-freeze mixture for use in the cooling systems of motor vehicles was examined for the Chief Fire Officer and three samples of spray dried skimmed milk powder were examined for Preston and Chorley Hospital Management Committee.

